TIERRA SOLUTIONS, INC.SM

Transmitted Via Federal Express

October 10, 2014

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Re: **Combined Sewer Overflow/Stormwater Outfall Investigation Phase I Evaluation/Recommendation Report** –*Revision 0, October 2014*

Dear Ms. Yeh

Tierra Solutions, Inc. (funding and performing, on behalf of Occidental Chemical Corporation as successor to Diamond Shamrock Chemicals Company) hereby encloses for your review and comment the **Combined Sewer Overflow/Stormwater Outfall Investigation Phase I Evaluation/Recommendation Report** – *Revision 0, October 2014*, which has been developed to document the evaluation of data collected as part of Phase I of the combined sewer overflow/stormwater outfall (CSO/SWO) investigation implemented under the United States Environmental Protection Agency-(USEPA-) approved Combined Sewer Overflow/Stormwater Outfall Investigation Quality Assurance Project Plan.

Subsequent to your review of this report, and as a conclusion to this report, Tierra Solutions, Inc. requests a meeting with USEPA to review the results of the Phase I evaluation and develop the approach and scope for the Phase II CSO/SWO investigation program.

Sincerely,

Paul Brzozowski
Project Manager
On behalf of Occidental Chemical Corporation
(as successor to Diamond Shamrock Chemicals Company)

Enclosures

cc: Cliff Firstenberg, Tierra Solutions, Inc.
Brian Mikucki, Tierra Solutions, Inc.
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Combined Sewer Overflow/Stormwater Outfall Investigation

Phase I Evaluation/ Recommendation Report

Tierra Solutions, Inc.

East Brunswick, New Jersey

October 2014

Revision 0

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Acronyms and Abbreviations

CFC	continuous flow centrifuge
CH	clean hands
COPC	constituent of potential concern
COPEC	constituent of potential ecological concern
CSO	combined sewer overflow
CSO/SWO S&AP	Combined Sewer Overflow/Stormwater Overflow Sampling and Analytical Plan
DH	dirty hands
DOC	dissolved organic carbon
HSM	high-solids mass
LPRSA	Lower Passaic River Study Area
LSM	low-solids mass
mg/L	milligrams per liter
NOAA NWS	National Oceanic and Atmospheric Administration's National Weather Service
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxin
PCDF	polychlorinated dibenzofuran
POC	particulate organic carbon
PVSC	Passaic Valley Sewerage Commissioners

QA	quality assurance
QAPP	Combined Sewer Overflow/Stormwater Outfall Investigation Quality Assurance Project Plan
QC	quality control
Phase I Report	Phase I Data Evaluation/Recommendation Report
POTW	publically owned treatment works
SIM	selective ion monitoring
SOP	standard operating procedure
SVOC	semivolatile organic compound
SWO	stormwater outfall
TDS	total dissolved solid
TEPH	total extractable petroleum hydrocarbons
Tierra	Tierra Solutions, Inc.
TOC	total organic carbon
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1. Introduction

This Phase I Evaluation/Recommendation Report (Phase I Report) has been developed by Tierra Solutions, Inc. (Tierra), on behalf of Occidental Chemical Corporation, the successor to Diamond Shamrock Chemicals Company (formerly known as Diamond Alkali Company). The Phase I Report documents the evaluation of data collected as part of Phase I of the combined sewer overflow/stormwater outfall (CSO/SWO) investigation implemented under the United States Environmental Protection Agency- (USEPA-) approved Combined Sewer Overflow/Stormwater Outfall Investigation Quality Assurance Project Plan (QAPP; Tierra 2013). The QAPP was developed to guide the collection of CSO, SWO, and publicly owned treatment works (POTW) samples from within the Lower Passaic River Study Area (LPRSA). The main objective of the CSO/SWO investigation is to characterize and quantify contaminants in both particulate- and dissolved-phases present in runoff discharging to the LPRSA via CSO and SWO conveyances, such that subsequent determinations of contaminant loadings can be made using models, developed by others, for the lower Passaic River.

The unique challenge of the CSO/SWO investigation is the quantification of organic contaminants found in the effluent of CSOs and SWOs, which are typically bound to particulates and, to a lesser degree, in the dissolved-phase. Quantitation limits associated with the particulate-phase of the effluent are particularly challenging to achieve, in that quantitation limits needed to reach the program data quality objectives require a sufficient mass of solids be collected for detection via standard, USEPA-approved laboratory analyses. The challenges associated with collecting a sufficient mass of solids for analysis are one of the focuses of the Phase I investigation.

Various sampling methods have been used previously in the LPRSA to collect the necessary solids mass for analysis, with varying results. As such, a two-phased approach for the CSO/SWO investigation was developed in coordination with USEPA. This two-phased approach incorporates, as Phase I, an initial side-by-side sampling program for evaluating three sampling approaches to inform the selection of the most appropriate sampling approach to quantify contaminants in the solid- (particulate), dissolved-, and whole water-phases: low-solids mass (LSM), high-solids mass (HSM), and whole water. Phase II of the program will consist of collecting CSO, SWO, and POTW samples at target locations using the sampling and analytical technique(s) selected after evaluation of Phase I results (the subject of this Phase I Report).

The LSM approach is a modification of the methods described in the USEPA Combined Sewer Overflow/Stormwater Overflow Sampling and Analytical Plan, Revision No. 2.0, August 2008 (CSO/SWO S&AP). The CSO/SWO S&AP was, in turn, based on methods that were implemented in the 1998 to 2004 Contaminant Assessment and Reduction Program (Great Lakes Environmental Center 2008) and the 2008 USEPA CSO/SWO solid-phase sampling conducted by Malcolm Pirnie, Inc. (2008). The LSM approach requires modifications to standardized analytical methods for solids sample analyses because a relatively small mass of particulates is acquired during the sample collection procedure. The HSM approach was

proposed in the LPRSA CSO Investigation Work Plan/Field Sampling Plan Revision No. 1 (Tierra 2002). The HSM approach calls for the collection of a greater mass of particulates than the LSM method, and similar to the mass specified in standardized analytical methods. The whole water approach is similar to the LSM approach, except that the particulate and dissolved-phases are not separated prior to analysis.

1.1 Organization of Report

The remainder of this Phase I Report is organized as follows:

- *Section 2 – Summary of Field Activities:* Summarizes the three sample collection methods and associated sample collection activities completed.
- *Section 3 – Summary of Evaluation Process:* Summarizes the process used to evaluate the implementability and effectiveness of the three sample collection methods.
- *Section 4 – Implementation Evaluation:* Summarizes the evaluation of the implementability of the three sample collection methods.
- *Section 5 – Analytical Data Evaluation*: Summarizes the evaluation of the analytical data obtained for the three sample collection methods.
- *Section 6 – Conclusions/Recommendations:* Summarizes the conclusions of the evaluation process and provides the recommended path forward.
- *Section 7 – References:* Provides a summary of the references used in this Phase I Report.

2. Summary of Field Activities

Phase I sampling consisted of collecting and analyzing samples using three sample collection methods (LSM, HSM, and whole water) during two precipitation events at the selected CSO (Clay Street in Newark, New Jersey). The field sample collection activities were implemented in accordance with the Field Standard Operating Procedures (SOPs) contained in the QAPP (Tierra 2013). It should be noted that the QAPP originally specified collection of samples from two different CSO locations: Clay Street CSO in Newark, New Jersey and Ivy Street CSO in Kearny, New Jersey. However, due to access limitations to the Ivy Street CSO imposed by the City of Kearny and to meet the Phase I implementation schedule, USEPA and Tierra decided to collect an additional sample at the Clay Street CSO (for a total of two) in lieu of sampling at the Ivy Street CSO during Phase I. Modifications were made to the QAPP (Tierra 2013) to address this change.

2.1 Sample Collection System

A sample collection system was designed to collect all three sample types (LSM, HSM, and whole water) simultaneously from the same effluent stream and over the same period of time by controlling the flow rate of effluent entering different sample collection tanks and the continuous flow centrifuge (CFC). The sample collection system utilized an enclosed trailer as a secure platform for mounting/housing the sampling equipment and controls. Sampling equipment included a bulk sample collection tank, peristaltic pumps (one large-diameter peristaltic pump and three small-diameter peristaltic pumps), CFC, and associated tubing and fittings. A stand-alone tow-behind generator was staged near the sample collection trailer during sample collection. Figures 2-1, 2-2, and 2-3 present the schematic of the sample collection equipment setup. SOP No. 2 – Pre-Mobilization and SOP No. 3 – Mobilization, Bulk Sample Collection, and Transportation (Tierra 2013) provide additional details regarding the sample collection system.

During each sampling event, a weighted rod/tubing assembly (Figure 2-4) was deployed into the manhole of the diversion chamber at the Clay Street CSO for bulk sample collection. Large-diameter intake tubing (i.e., 1.125-inch outside diameter for large-diameter high-flow peristaltic pump) was secured to the weighted rod/tubing assembly and connected to a large-diameter high-flow peristaltic pump in the trailer to extract bulk sample for collection. Three sample ports were installed along the large-diameter intake tubing, two before, and one after the CFC. Small-diameter sample tubing and small-diameter peristaltic pumps were connected to the sample ports to pump bulk sample from the large-diameter intake tubing line into two bulk sample collection tanks (whole water/LSM and HSM dissolved bulk sample collection tanks). From an initial single sample flow stream, flow was continuously diverted to the Teflon®-lined (double-lined) whole water/LSM bulk sample collection tank (via the second sample port to generate the LSM and whole water samples) and the CFC (to generate solids in the centrifuge for HSM particulate analysis and CFC effluent for HSM dissolved analysis). A portion of the CFC effluent that passed through the CFC was diverted via the third sample port to the Teflon®-lined (double-lined) HSM dissolved bulk sample collection tank to generate HSM dissolved samples. The flow rate to each bulk sample collection tank was controlled so that the whole

water/LSM bulk sample collection tank filled in approximately the same time as the HSM dissolved bulk sample collection tank. The excess effluent that passed through the CFC was returned to the same manhole via large-diameter tubing downstream of the CFC and HSM dissolved bulk sample collection tank.

The effluent entered the CFC from the bottom through a stationary feed nozzle and is directed towards the CFC bowl. A variable frequency drive mounted on the trailer was used to operate and control the speed of the CFC. Solids in the bulk effluent were forced to the bowl wall by centrifugal force. The interior of the CFC bowl was lined with a Teflon® liner to capture the separated solids. The clarified liquid was continuously discharged through the top of the centrifuge.

Following collection of effluent into the bulk sample collection tanks, aqueous (LSM bulk, HSM dissolved, and whole water) samples were collected using small-diameter peristaltic pumps and dedicated Teflon® tubing from the bulk sample collection tanks. The LSM bulk samples were further processed in analytical laboratories, via filtration, to generate LSM particulate and LSM dissolved samples for analysis. HSM particulate samples were collected from the solids retained in the CFC bowl and liner for laboratory analysis. SOP No. 4 – Sample Processing and Collection (Tierra 2013) provides additional details on sample processing.

Upon receipt of LSM bulk samples by the laboratory, the equipment and procedures described in SOP No. L-24 – LSM Bulk Sample Filtration were utilized to filter the LSM bulk sample, thereby generating LSM particulate and LSM dissolved samples for analysis. Post-filtration of the LSM bulk sample, particulate material captured on the filter media was put forward for analysis as the LSM particulate sample, while the filtrate was analyzed as the corresponding LSM dissolved sample. Two approaches were included in SOP No. L-24 – LSM Bulk Sample Filtration to filter the LSM bulk samples. The primary approach involved the use of pressurized filtration and a flat glass fiber filter(s). The secondary approach utilized a system by which bulk sample is pumped through a wound glass fiber filter cartridge and a flat glass fiber filter in series. The secondary approach was included for use as a contingency when/if excessive clogging was observed during implementation of the primary approach due to sample particulate mass characteristics, such as high total suspended solids (TSS) content or large individual particulate size.

During bulk sample collection at the manhole, TSS/total dissolved solids (TDS) grab samples were collected every 30 minutes via the first sample withdrawal port installed along the large-diameter intake tubing prior to the CFC and whole water/LSM bulk sample collection tank. Additionally during sample collection, selected physiochemical water quality parameters (conductivity, turbidity, and temperature) were measured (logged continuously and manually recorded every 30 minutes using a water quality meter), water depth was measured at the sample collection manhole, and flow data were recorded. An in-line flow meter, located downstream of the CFC, was used to monitor and record flow rate approximately every 30 minutes.

Grab metals samples (including mercury and methyl mercury) were collected in accordance with SOP No. 5 – Metals Sampling via Method 1669 Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (USEPA 1996) (Tierra 2013). This methodology has been developed based on USEPA Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (USEPA 1996). Grab (total and dissolved) samples for trace metals analysis, including mercury and methyl mercury, and a TSS sample were collected directly from the manhole into laboratory-supplied containers using a separate peristaltic pump and laboratory-supplied Teflon® tubing. This sampling method was employed so that metals samples could be collected using "clean hands" (CH) and "dirty hands" (DH) sampling methods that minimize potential sample contamination from trace metals during sample collection. Sampling activities were conducted with care to minimize exposure of the sample to atmospheric, human, and other sources of potential metals contamination. Dissolved metals samples were collected first by field-filtering (via an in-line filter) the effluent followed by collection of samples for total metals analysis.

2.2 Mobilization for Sample Collection

During Phase I, Tierra conducted weather monitoring on a daily basis using multiple sources to evaluate timing of mobilization for sample collection. For a precipitation event to trigger mobilization for sample collection, the event must have anticipated to produce at least 0.2 inch of rain with an average intensity of at least 0.03 inch per hour with no more than 4 consecutive dry hours during the event. Following a decision to mobilize for sample collection, staff mobilized the sample collection system to the sampling location. Tierra coordinated/communicated with PVSC to determine timing of the regulator gate valve closing at the Clay Street CSO and appropriate time for initiating sample collection. Sample collection was only initiated after PVSC confirmed that the regulator gate valve was closed at the Clay Street CSO and that an overflow was occurring. In addition, a sidewalk occupancy permit was obtained in advance from the City of Newark to stage the sample collection system along the sidewalk at the Clay Street CSO; the Newark Police Department were also contacted to provide traffic control. Following bulk sample collection, the sample collection system was transported back to the processing facility at 80 Lister Avenue in Newark, New Jersey. Samples were shipped to analytical laboratories the day after bulk sample collection in accordance with the procedures outlined in the QAPP (Tierra 2013).

2.3 Sample Collection – Clay Street Combined Sewer Overflow

Phase I sampling was completed at the Clay Street CSO between June 2013 and April 2014. It was critical that sufficient sample mass and/or volume be obtained to accomplish the primary objective of this phase: the evaluation and selection of the most appropriate sampling method for each analytical group. For this reason, an analytical hierarchy was established for sample collection. For a given sampling event, if sufficient volume was obtained to complete sampling via the three methods for the analytical groups and matrices, then samples were generated in the sequence described in the analytical hierarchy detailed in the QAPP (Tierra 2013) (with the exception of samples for volatile organic compound [VOC] analysis, which were

collected first). In addition to the sample mass/volume required for primary sample analysis (including quality assurance/quality control [QA/QC] samples) contingency sample mass/volume was collected and shipped to the laboratories to mitigate any potential issues related to sample breakage/loss during sample shipment and analysis. Multiple attempts were needed during each sampling event at the Clay Street CSO to collect all samples (primary and contingency) for the target analytical groups using the three sampling approaches. Table 2-1 summarizes the number and type of samples collected and analyzed during each sampling event/attempt as part of the Phase I sampling program.

Table 2-1
Summary of Samples Collected and Analyzed

Event and Attempt	Date	Collection Method and Analytical Parameters		
		HSM	LSM	Whole Water
Event 1: *Attempt 1*	June 10, 2013	PCDDs/PCDFs, PCB congeners	PCDDs/PCDFs, PCB congeners	PCDDs/PCDFs, PCB congeners, metals, mercury, and methyl mercury
Event 1: *Attempt 2*	July 1, 2013	All[1],excluding PCDDs/PCDFs, PCB congeners, POC, grain size, metals, mercury and methyl mercury	All[1],excluding PCDDs/PCDFs, PCB congeners, TOC, grain size, metals, mercury and methyl mercury	All[1],excluding DOC, POC, metals, mercury and methyl mercury
Event 1: *Attempt 3*	April 30, 2014	PCDDs/PCDFs, PCB congeners, chlorinated herbicides	PCDDs/PCDFs, PCB congeners, chlorinated herbicides	PCDDs/PCDFs, PCB congeners, chlorinated herbicides
Event 2: *Attempt 1*	October 7, 2013	VOCs	VOCs	VOCs
Event 2: *Attempt 2*[2]	December 7, 2013	All[1],excluding VOCs, grain size, metals, mercury and methyl mercury	All[1],excluding VOCs, TOC, grain size, metals, mercury and methyl mercury	All[1],excluding VOCs, DOC, POC

Notes:

[1] All includes the following analyses: polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans (PCDDs/PCDFs), polychlorinated biphenyl (PCB) congeners, Aroclor PCBs, organochlorine pesticides, semivolatile organic compounds (SVOCs), semivolatile organics selective ion monitoring (SVOC SIM), chlorinated herbicides, metals, mercury, methyl mercury, cyanide, VOCs, total extractable petroleum hydrocarbons (TEPH), TSS, TDS, total organic carbon (TOC), particulate organic carbon (POC), dissolved organic carbon (DOC), and grain size.

[2] Grab total and dissolved metals (including mercury and methyl mercury) samples were collected on June 10, 2013 (Event 1, Attempt 1) and December 7, 2013 (Event 2, Attempt 2).

The PCDDs/PCDFs, PCB congeners, and organochlorine pesticides were analyzed by Vista Analytical in El Dorado Hills, California. Brooks Rand laboratory in Seattle, Washington analyzed the total and dissolved

metals (including mercury and methyl mercury) samples. The remainder of the analyses was performed by TestAmerica in Burlington, Vermont.

2.4 Decontamination/Cleaning

Between sampling events, a full decontamination of the sample collection system was performed in accordance with the procedures outlined in the QAPP (Tierra 2013). Non-dedicated equipment (i.e., stainless steel bowls and spoons) were decontaminated and dedicated sampling equipment (i.e., CFC bowl Teflon® liner, Teflon® tank liners, and small- and large-diameter Teflon® sample tubing) were replaced with new dedicated sampling equipment. Between sampling attempts (i.e., between Attempts #1 and #2 of Event #1), non-dedicated sampling equipment was decontaminated I accordance with the procedures in the QAPP (Tierra 2013) and but dedicated sampling equipment were not replaced (unless damaged). However, between sampling attempts, a “gross cleaning” of the sample collection system was performed that consisted of circulating tap water through the system to remove residual particulates/liquids.

3. Summary of Evaluation Process

Phase I data was evaluated, on an analytical group basis, for each sampling approach using the following criteria as defined in the QAPP (Tierra 2013):

- Implementability of field sampling and sample processing activities
- Ability to generate sample mass/volume to accommodate the full target analytical groups
- Ability of laboratories to generate usable data
- Ability to generate greater frequency of detection for analytes that are contaminants of potential concern (COPCs) and/or contaminants of potential ecological concern (COPECs) listed in the Lower Eight Miles of the Lower Passaic River Feasibility Study Report (The Louis Berger Group 2014)
- Ability to generate greater frequency of detection for analytes within a given analytical group

Analytical groups included in the evaluation were limited to those where samples were collected using two or more of the sampling methods (LSM, HSM, and/or whole water); therefore, the Phase I evaluation process included comparison of the analytical groups as defined in Table 3-1 below.

Table 3-1
Analytical Groups Included in Phase I Evaluation Process

Analytical Group	Sampling Methods Implemented			Analytical Group Included in Phase I Evaluation Process?
	Whole Water	LSM	HSM	
PCDDs/PCDFs	x	x	x	Yes
PCB Congeners	x	x	x	Yes
Aroclor PCBs	x	x	x	Yes
Organochlorine Pesticides	x	x	x	Yes
SVOCs	x	x	x	Yes
SVOC SIM	x	x	x	Yes
Chlorinated Herbicides	x	x	x	Yes
Cyanide	x	-	x	Yes
VOCs	x	-	x	Yes
TEPH	x		x	Yes
TSS	x	x	x	No
TDS	x	x	x	No
TOC	x		x	No
POC	-	x	-	No
DOC	-	x	x	No
Grain Size	x	-	-	No
Metals	x	-	-	No
Mercury	x	-	-	No
Methyl mercury	x	-	-	No

The Phase I evaluation process was carried out according to the approach specified in Worksheet #17 of the QAPP (Tierra 2013). The evaluation process consisted of the following four sequential steps:

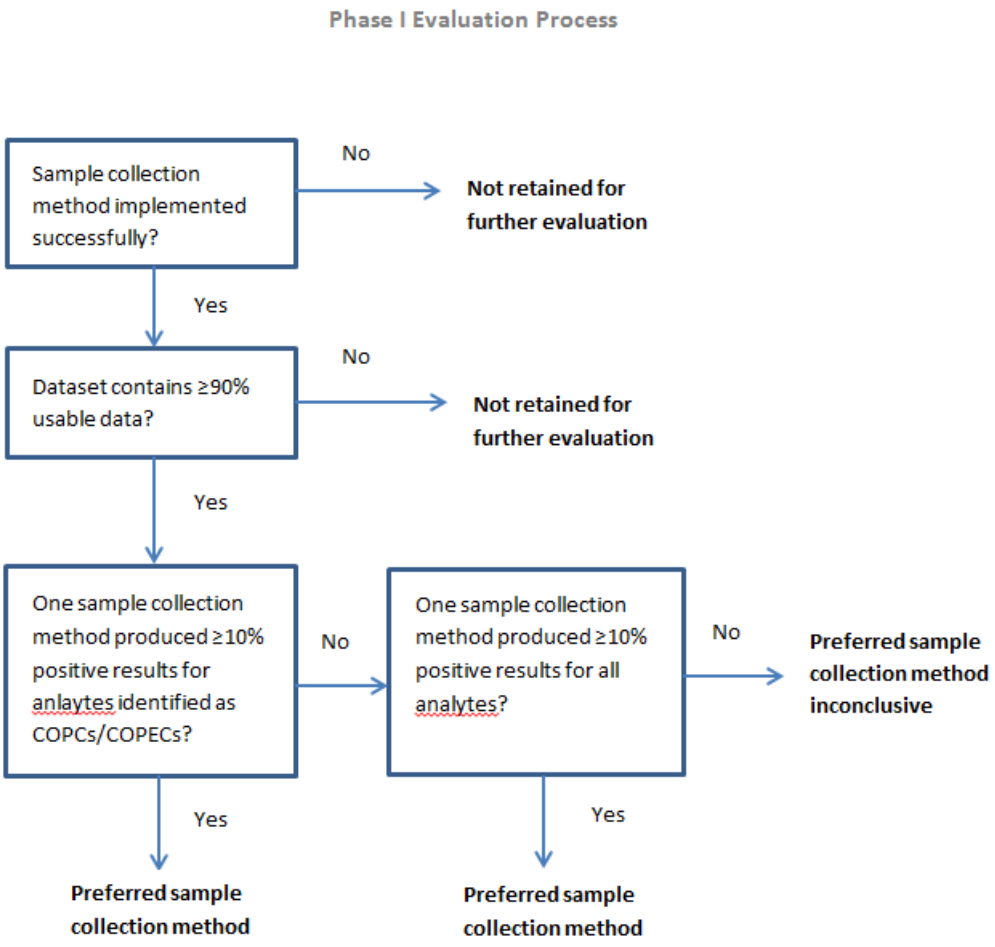
- *Step 1 – Implementability:* Implementability was defined as successful collection and processing of samples for laboratory analysis meeting minimum requirements as listed in Worksheets #19-1 through #19-4 of the QAPP.

- *Step 2 – Data Quality:* Data quality was determined based upon the outcome of the data validation task (outlined in Worksheet #36 and included as Appendix C of the QAPP). Data flagged "R" were rejected based upon the project-defined validation procedures and were not considered to be usable. Datasets for a particular analytical group containing a minimum of 90% usable data were further evaluated.

- *Step 3 – Frequency of Detections of COPCs/COPECs:* If for a given analytical group, one sample collection method produced greater than 10% positive results (detections) for analytes identified as COPCs, then that sample collection method was identified as the preferred sample collection method for that particular analytical group.

- *Step 4 – Frequency of Detections of All Analytes:* If for a given analytical group, one sample collection method produced greater than 10% of the positive results (detections) of target analytes, then that sample collection method was identified as the preferred sample collection method for that particular analytical group.

If, for a given analytical group, no sample collection method produced greater than 10% of the positive results (detections), then the preferred sample collection method for that analytical group was identified as inconclusive. The evaluation process is represented below.



Section 4 describes the results of the evaluation process with respect to implementability (Step 1). The results of the evaluation process with respect to analytical data evaluation (Steps 2 to 4) are described in Section 5. Results are documented on the comparison charts outlined in Worksheet #11 of the QAPP (Tierra 2013) (included as Appendices A to J) and referenced in the applicable sections(s) of this Phase I Report.

4. Implementability Evaluation

As discussed in Section 3, the first step in the evaluation process is an assessment of implementability. Implementability is defined as the degree to which each sample collection method was successful in collecting the required samples for laboratory analysis and meeting the minimum analytical SOP requirements as defined in the QAPP (Worksheets #19-1 through 19-4; Tierra 2013). For any given sampling attempt, if a sample collection method was not successful in collecting samples for laboratory analyses, it would not be considered for further evaluation and was not included in the comparison of sample collection methods for that analytical group(s).

The following sections discuss implementation challenges common to all sample collection methods for consideration during the ultimate selection of sample collection method(s). A comparison of the sampling approaches with respect to implementation challenges encountered and ability to successfully generate target mass/volume for laboratory analysis is presented below.

4.1 Implementation Requirements and Challenges

Mobilization requirements were common for all sample types. Specific mobilization requirements and challenges addressed during the sample collection activities included the following:

- Site access and sidewalk closure and occupancy permit
- Coordination with Newark Police
- Weather monitoring
- Coordination with PVSC
- Storm duration

A sidewalk closure and occupancy permit was obtained from the City of Newark to access and stage the sample collection system at the Clay Street CSO. Such permit would be required for any sampling approach utilized in Phase II. The permit application was initially prepared and approved prior to the first sample collection event and renewed every 30 days during the Phase I sampling program. Therefore, the permit was in place at all times during the potential sample collection period. Typically, the City of Newark does not issue permit renewals and requires submitting a new permit application. However, because the sample collection task is rainfall dependent, the City of Newark agreed to issue permit renewals every 30 days. Sampling location within different townships may be subject to different requirements.

Tierra coordinated with the City of Newark police during sample collection to provide traffic/site safety control in accordance with New Jersey Department of Transportation regulations. The Clay Street CSO sampling location is located at the intersection of Clay Street and McCarter Highway in Newark, New Jersey. Due to

heavy traffic and the need to occupy the sidewalk, police support was required to provide traffic control. Additionally, site safety was needed to facilitate collection of bulk samples during nights and weekends.

Weather monitoring was performed during Phase I sample collection to determine an appropriate time to initiate mobilization for sample collection. The QAPP (Tierra 2013) states the following criterion for mobilization: "For a precipitation event to trigger mobilization for sample collection, the event must be anticipated to produce at least 0.2 inch of rain with an average intensity of at least 0.05 inch per hour with no more than 4 consecutive dry hours during the event." Based on the target storm duration of four to six hours for sample collection, the length of the rainfall period expected to meet the mobilization criteria was also considered. A four to six hour sample collection period was targeted as this was the length of time anticipated to be needed to collect enough solids within the CFC to obtain all samples based on the limited existing TSS data for CSO effluent. Tierra screened various weather forecast providers to select a precipitation forecast provider to predict storm events to prepare and quickly respond to potential storm events for sample collection. Given the capabilities of the weather services evaluated, The Weather Channel and Weather Underground were used for general, long-term (7- to 10-day) weather monitoring, while the National Oceanic and Atmospheric Administration's National Weather Service (NOAA's NWS) was used for more precise monitoring in (6- and 3-day forecasts) to evaluate the potential precipitation on an hourly basis. The NOAA's NWS station located at the Newark Liberty International Airport, New Jersey was identified as the location closest to the CSO location for the Phase I CSO/SWO sampling program. During periods of anticipated sample collection, monitoring of the forecast weather from the three providers was reviewed on a daily basis. Tierra monitored the forecast daily and whether there were events within 10, 7, 6, or 3 days with the potential to trigger mobilization for sample collection. Tierra then notified other members of the project team if an event was identified to trigger mobilization.

Following the initiation of Phase I sample collection, based on comparison of actual (hourly precipitation data in inches available through NOAA's NWS) and predicted precipitation data and overflows recorded at the Clay Street CSO for various storm events, the mobilization criterion was modified from average rainfall intensity of at least 0.05 inch per hour to an average intensity of at least 0.03 inch per hour. It was identified that several overflow events were missed due to the 0.05 inch per hour average rainfall intensity mobilization criterion and that an average intensity of 0.03 inch per hour resulted in sufficient overflow conditions at the Clay Street CSO. Therefore, the mobilization criterion was changed to 0.03 inch per hour for rainfall intensity. The mobilization criterion for total rainfall remained the same (0.2 inch of rain).

Although the modification to the mobilization criteria resulted in mitigating missed overflows, sample collection could not be completed during six mobilization events due to other factors, including:

- No rainfall or less than anticipated rainfall, contrary to forecasted conditions
- No overflow occurrence during rain events that met the mobilization criteria

- Overflow lasted for less than the target duration of 4 to 6 hours, resulting in no sample collection
- Water level in the diversion chamber manhole was low (approximately1 feet from the bottom), limiting the ability of the intake tubing to pump effluent and remain 1 foot off the bottom as required by the QAPP (Tierra 2013)
- An operational issue with the CFC

During anticipated storm events, Tierra coordinated with PVSC regarding the timing of regulator gate valve openings at the sampling location. During a storm event, as soon as the regulator gate valve was opened at the Clay Street CSO, PVSC contacted Tierra to notify them of the gate opening and overflow conditions at the Clay Street CSO. Sample collection was initiated following PVSC confirmation regarding gate opening. Following the storm event, PVSC contacted Tierra with notification that the regulator gate valve was closed at the Clay Street CSO, indicating the end of overflow conditions. PVSC had informed Tierra that overflows can occur without the regulator gate being opened. During one mobilization event on October 7, 2013, the sampling crew observed overflow at the Clay Street CSO location and bulk sample collection was initiated, although Tierra did not receive notification that the regulator gate valve had been opened (and, therefore, presumably was not).

4.2 Evaluation of Sampling Methods

The following subsections discuss the challenges associated with each of the sampling methods (HSM, LSM, whole water and grab metals) and the measures taken to address such challenges. The systematic evaluation of these methods is governed by the implementability of the sampling methods and the ability to generate target sample mass/volume to accommodate the full suite of target analytes.

4.2.1 High-Solids Mass

4.2.1.1 High-Solids Mass Particulate

As described in Section 2, HSM particulate samples were generated from the solids retained in the CFC bowl, and the samples were processed and shipped to analytical laboratories the day after bulk sample collection.

Implementability

Minor challenges were encountered during sample collection and modifications were implemented to address these challenges.

The CFC setup is more labor intensive as compared to the other sample collection methods (whole water and LSM). The CFC sampling equipment has moving parts and thus the potential for breakdown. To address the labor requirements and the complexity of operating the system, prior to the start of Phase I sample collection, an adequate number of personnel were trained to setup and operate the centrifuge and were required to be familiar with the SOPs and manufacturers' specifications of the multiple systems in the sample collection trailer. As part of the CSO/SWO investigation, a field demonstration and testing of the sample collection system was conducted on August 24, 2012 at the Ivy Street CSO outfall located in Kearny, New Jersey.

During all sampling attempts at the Clay Street CSO, two material types ("fines" and "non-fine paper-like material") were encountered in the CFC bowl during HSM particulate sample collection. The challenge was to create a homogeneous particulate sample for laboratory analyses. A modification to the SOP was implemented and a stainless steel blender was used to process and blend the fines and non-fines material to create a homogenous particulate sample for laboratory analysis. SOP No. 4 – Sample Processing and Collection (Tierra 2013) provides additional details on the blending process. The HSM particulate placed into sample containers by the field team during the first attempt of the first event consisted of only the fines portion of the HSM particulate material. Because this sample was not homogenized with the non-fines portion of the particulate, as was the case during all subsequent sampling attempts and events, data from this first sampling attempt was not considered useable for purposes of the Phase I evaluation and were not considered further and are not included in this report.

During pre-Phase I blank collection and decontamination activities, it was observed that small particulates remained in the CFC following prescribed decontamination procedures and caused potential issues with CFC operation. It was decided to add a decontamination step to power wash the CFC bowl to remove the residual particulates. The power-washing step adds more time to the decontamination process, but avoids potential operational issues with the CFC.

A significantly fewer number of sample containers were required to ship the HSM particulate samples (primary and contingency) compared to the LSM and whole water sample collection methods and, therefore, resulted in lower actual bottle breakage during shipping and required less time for sample packaging and shipment.

Ability to Generate Target Sample Mass/Volume

The HSM sample collection method generated sufficient solids mass required for the targeted sample analyses. A minimum of two sampling attempts was needed to generate the targeted solids mass (2,400 grams; including QA/QC samples and primary and contingency samples) during each sampling event. During a single sampling attempt (6-hour sample collection), sufficient solids mass (approximately 1,550 grams) was generated to collect primary samples (including QA/QC) to accommodate the full targeted

analytical groups (1,130 grams). An additional sampling attempt was needed to accommodate contingency sample mass for laboratory analysis. Note that this observation is based on one sampling location (Clay Street CSO) and solids mass retained in the CFC will vary at different CSO locations as it is dependent on the influent TSS.

4.2.1.2 High-Solids Mass Dissolved

As described in Section 2, the HSM dissolved samples were generated by subsampling from the HSM dissolved bulk sample collection tank using a small-diameter peristaltic pump and dedicated Teflon® tubing, and the samples were processed and shipped to analytical laboratories the day after bulk sample collection

Implementability

The challenges identified above for HSM particulate sampling with regards to operation and decontamination of the CFC apply to the HSM dissolved sampling.

A secondary tank was needed around the HSM bulk sample collection tank to facilitate the placement of ice which was used to immediately begin to chill, and to then maintain, the cool temperature of the HSM dissolved bulk sample.

Due to the high sample volume required for each analytical group, larger (than typically used for standard aqueous analytical methods) sample containers were required to ship HSM dissolved samples compared to the HSM particulate sampling method and, therefore, resulted in bottle breakage during shipping and required more time for sample processing and shipment . However, approximately the same number of sample containers were needed to collect the HSM dissolved samples as the LSM bulk and whole water samples. Additional sample packaging steps (e.g., bubble wrap, pre-cut foam) were undertaken to mitigate bottle breakage during sample shipment.

Ability to Generate Target Sample Mass/Volume

One successful six-hour sampling attempt/event was needed to generate the target sample volume (approximately 230 liters; including QA/QC samples and primary and contingency samples) to accommodate the full target analytical groups. However, as noted in Section 2, only a portion of the effluent stream from the CFC was diverted to the HSM bulk sample collection tank. The rate at which the effluent was pumped from the CFC effluent stream into the HSM bulk sample collection tank could potentially be modified to collect the required volume for HSM dissolved samples within a shorter time period.

4.2.2 Low-Solids Mass

4.2.2.1 Low-Solids Mass Bulk Sample Collection

Similar to HSM dissolved samples, LSM bulk samples were generated for laboratory analyses by subsampling from the whole water/LSM bulk sample collection tank using a small-diameter peristaltic pump and dedicated Teflon® tubing, and the samples were processed and shipped to analytical laboratories the day after bulk sample collection. The laboratory completed filtration of the LSM bulk sample to generate LSM particulate and LSM dissolved samples.

Implementability

The challenges identified above for HSM dissolved sampling (i.e. need for a secondary tank and large sample volumes/containers) apply to the LSM bulk sampling.

LSM bulk sample collection is similar to HSM dissolved sample collection, except the LSM bulk sample is collected prior to the CFC. As such, LSM bulk sample collection setup is generally less labor intensive compared to the HSM sample collection method.

As discussed in Section 2, the LSM/whole water bulk sample collection tank was double lined with a Teflon® liner. During sample processing activities on December 9, 2013, a tear/rip was observed on the inside Teflon® liner of the double-lined LSM bulk/whole water bulk sample collection tank. The potential for liner tear/rip was identified during design of the sample collection system and the bulk sample collection tanks were double-lined with Teflon® liners to avoid potential for bulk effluent to leak from the Teflon® liner and contact the tank. As such, no negative impacts to the sample was identified due to the identified tear/rip.

Ability to Generate Target Sample Mass/Volume

One successful 6-hour sampling attempt/event was needed to generate the target sample volume (approximately 450 liters, including QA/QC samples and primary and contingency samples) to accommodate the full target analytical groups. However, as noted in Section 2, only a portion of the effluent stream from the manhole was diverted to the LSM bulk sample collection tank. The rate at which the effluent was pumped from the effluent stream into the LSM bulk sample collection tank could potentially be modified to collect the required volume for LSM bulk samples within a shorter time period.

4.2.2.2 Low-Solids Mass Bulk Laboratory Filtration

As described in Section 2, LSM bulk samples were generated by filtration at the laboratory.

Implementability

The laboratory successfully filtered all of the LSM bulk samples using the primary approach. Although filtration of LSM bulk samples was relatively time consuming (as described below), the use of the secondary approach was not necessary.

The LSM bulk sample separation procedure is labor intensive due to the preparatory decontamination and setup requirements of the multi-component equipment. The LSM bulk sample separation equipment (for both the primary and secondary approach), comprise multiple components, including various tubing and filter media housing. These component parts require rigorous decontamination, and associated blank collection, between uses in separating LSM bulk material obtained from different sampling events. Additionally, the filter media used to separate the LSM bulk samples is pre-cleaned in lots prior to use to verify that filters are not contributing any contamination to the LSM samples during bulk sample filtration. A representative filter from the lot is selected and submitted for laboratory analysis. Results of the analyses are used to certify that the filter media are contaminant-free or to establish background contaminant concentrations in the filter media as applicable. Pre-cleaned filter media must be re-certified to re-establish contaminant background concentration if not used to separate samples over a period greater than 6 months from the initial evaluation.

The LSM bulk sample separation procedure is time consuming as it requires the filtration of large volumes of LSM bulk sample to meet the analytical sensitivity requirements established in the QAPP (Tierra 2013). Table 4-1 below identifies the volume requirements for each analytical group.

Table 4-1
Analytical Group Volume Requirements

Analytical Group	Minimum Sample Volume (liters)
PCDD/PCDFs	40
PCB Congeners	20
Organochlorine Pesticides	10
SVOCs	10
SVOC SIM	10
Aroclor PCBs	4
Chlorinated Herbicides	4
POC/DOC	16
TSS	3
TDS	1.5

Minimum sample volume requirements listed above include the primary sample and associated QA/QC samples. During Phase I, 118.5 liters of LSM bulk sample were processed requiring approximately 48 labor hours. This volume/time does not take into consideration contingency volume that might be needed.

Ability to Generate Target Sample Mass/Volume

The LSM bulk sample filtration process did generate the target sample volume for LSM dissolved samples. However, the LSM bulk sample filtration process was insufficient in generating the target sample mass for LSM particulate samples. Table 4-2 below provides the targeted sample mass for LSM particulate samples for each analytical group, as well as the corresponding actual mass of LSM particulate samples collected and analyzed by the laboratory during Phase I.

Table 4-2
Targeted LSM Particulate Mass and Corresponding Observed Actual Particulate Mass

Analytical Group	Targeted LSM Particulate Mass (grams)[a]	Event 1/ Attempt 1 LSM Particulate Mass (grams)[b]	Event 1/ Attempt 2 LSM Particulate Mass (grams)[b]	Event 2/ Attempt 2 LSM Particulate Mass (grams)[b]	Event 1/ Attempt 3 LSM Particulate Mass (grams)[b]
PCDD/PCDFs	1.5	0.370	---	0.079	0.077
PCB Congeners	0.75	0.183	---	0.040	0.040
Organochlorine Pesticides	0.375	---	0.166	0.020	---
SVOCs	0.375	---	0.163	0.020	---
SVOC SIM	0.375	---	0.160	0.020	---
Aroclor PCBs	0.15	---	0.068	0.008	---
Chlorinated Herbicides	0.15	---	0.064	0.009	0.008
POC	0.60	---	0.263	0.010	---

Notes:
a Target sample mass was based on a historical TSS average of 150 milligrams per liter (mg/L). These values reflect the minimum sample mass set as a requirement for a single sample analysis and do not include additional QC mass requirements.
b Particulate mass values observed during the field investigation are that of the original field sample only (without additional QC mass requirements) allowing direct comparison with the target mass value provided.
c Event 1/Attempt 1 PCDD/PCDFs and PCB congener samples were analyzed by the laboratory but are not part of the data evaluation.

The low mass obtained for the LSM particulate samples is related to significantly lower (as low as 8 mg/L) than anticipated (150 mg/L) TSS concentrations observed during the sampling events/attempts at the Clay Street CSO. Reduced sample mass has a direct relationship with reduced analytical sensitivity; however, the LSM sample results were retained for further evaluation as part of the Phase I evaluation process.

4.2.3 Whole Water

As described in Section 2, whole water samples were generated for laboratory analyses by subsampling from the LSM/whole water bulk sample collection tank using a small-diameter peristaltic pump and dedicated Teflon® tubing, and the samples were processed and shipped to analytical laboratories the day after bulk sample collection.

The whole water sampling method is identical to the LSM bulk sampling method, with the only difference being there is no laboratory filtration to generate particulate and dissolved samples.

4.2.4 Grab Metals

As described in Section 2, samples for grab metals, including mercury and methyl mercury analyses, were collected directly from the effluent stream into sample containers and shipped on the same day (to meet holding time requirements) to the analytical laboratory for analysis.

Implementability

No significant challenges were encountered during implementation of grab metals sampling. However, with regards to ease of implementation, adequate lead time (approximately 2 to 3 weeks) is required for the laboratory to decontaminate tubing and sample containers in accordance with the trace metals sampling protocol (USEPA 1996). Additionally, CH and DH sampling procedures needed to be implemented in accordance with SOP No. 5 – Metals Sampling via Method 1669 Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (USEPA 1996) (Tierra 2013). The CH and DH procedures require additional preparation and implementation time in the field. The samples for metals (total and dissolved) were not preserved in the field. To meet the analytical method holding time requirements, efforts were made to process and ship the metals samples via overnight carrier on the same day of sample collection contingent on the time of sample collection.

Ability to Generate Target Sample Mass/Volume

The sampling method was able to generate the target sample volume during each sampling event for the full target analytical groups.

4.3 Summary of Implementability Evaluation

In summary, with the exception of the samples collected during Event #1 Attempt #1 (see Section 4.2.1.1), all three sampling approaches (HSM, LSM, and whole water) were successful in collecting the required samples for laboratory analyses for all analytical groups during the sampling events/attempts at the Clay

Street CSO. Therefore, all samples collected met the evaluation criteria based on implementability and were retained for further evaluation. However, as noted in Section 2, multiple attempts were needed to incrementally (following the analytical hierarchy established in the QAPP) complete the overall sample volume requirements and the LSM particulate samples did not meet the required targeted mass.

5. Analytical Data Evaluation

This section presents the results of Steps 2, 3, and 4 of the Phase I data evaluation process.

5.1 Data Usability

The second step of the evaluation process is an evaluation of the quality of the data generated. As stated above, validated data must contain a minimum of 90% usable data to be further assessed in the evaluation process. Table 5-1 below contains a summary of data that did not meet this criterion and, therefore, was not considered further in the evaluation process. Each is discussed in further detail below.

Table 5-1
Summary of Data Quality Failures

Sample Collection Method and Analytical Group	Event/ Attempt	Primary/ Duplicate Sample	Total Number of Results Reported	Number of Results Affected	% of Results Affected
HSM Particulate – Organochlorine Pesticides	Event #1, Attempt #2	primary	28	4	14
LSM Particulate – SVOCs	Event #1 Attempt #2	primary	50	9	18
HSM Dissolved – SVOCs	Event #1 Attempt #2	primary	50	8	16
HSM Dissolved – SVOCs	Event #1 Attempt #2	duplicate	50	8	16
HSM Particulate – VOCs	Event #1 Attempt #2	primary (fines)	6	4	67
HSM Particulate – VOCs	Event #1 Attempt #2	primary (non-fines)	6	4	67
HSM Particulate – VOCs	Event #1 Attempt #2	duplicate (fines)	6	4	67
HSM Particulate – VOCs	Event #2 Attempt #1	primary (fines)	6	4	67
HSM Particulate – VOCs	Event #2 Attempt #1	primary (non-fines)	6	5	83
HSM Particulate – VOCs	Event #2 Attempt #1	duplicate (fines)	6	4	67

- HSM Particulate – Organochlorine Pesticides: Four results in the Event #1, Attempt #2 primary sample were rejected due to labeled analog recovery failure.

- LSM Particulate – SVOCs: Eleven results in the Event #1, Attempt #2 primary sample were rejected due to extremely poor (defined as recovery that is too low to be qualified as an estimate and thus the data must be rejected) internal standard response.

- HSM Dissolved – SVOCs: Eighteen results in the Event #1, Attempt #2 primary and duplicate samples were rejected due to extremely poor (defined as recovery that is too low to be qualified as an estimate and thus the data must be rejected) internal standard response..

- HSM Particulate – VOCs: Twenty-five results in the Event #1, Attempt #2 and Event #1, Attempt #2 primary (fines), primary (non-fines), and duplicate (fines) samples were rejected due to low internal standard responses.

Note that these data quality issues were related to laboratory performance and are not likely sample collection technique dependent.

All other data for each sampling method and analytical group met the usability requirements set out in the QAPP (Tierra 2013) and were considered further in the evaluation process.

5.2 Steps 3 and 4: Frequency of Detections

Data for a given analytical group and sampling method that were not eliminated from the evaluation process during Steps 1 or 2 were assessed in Steps 3 and 4 based on frequency of detections as defined above. A summary of the Steps 3 and 4 evaluations per analytical group are summarized below. In addition, a summary of the overall result of the evaluation process is also provided. As discussed in Section 4, the HSM particulate placed into sample containers by the field team during the first attempt of the first event consisted of only the fines portion of the HSM particulate material. Because this sample was not homogenized with the non-fines portion of the particulate, as was the case during all subsequent sampling attempts and events, data from this first sampling attempt was not considered useable for purposes of the Phase I data evaluation.

5.2.1 Polychlorinated Dibenzo-p-dioxins/Polychlorinated Dibenzofurans

All three sample collection and processing methods (LSM, HSM, and whole water) were evaluated for the PCDD/PCDFs analytical group. Samples (primary sample and field duplicate) were collected for PCDD/PCDF analysis during Event #1, Attempt #3 and Event #2, Attempt #2. A summary of the findings of the evaluation Steps 3 and 4 for PCDD/PCDF data are provided below. Detailed evaluation sheets (Worksheet #11) can be found in Appendix A.

- Based on Event #1, Attempt #3 (duplicate samples only), LSM and HSM sample collection methods had at least 10% more positive results for COPC/COPECs than the whole water sample collection method. Neither LSM nor HSM sample collection methods had at least 10% more positive results for PCDDs/PCDFs overall. This was not observed in the results for the primary samples; no sample

collection method resulted in at least 10% more positive results for COPC/COPECs or PCDDs/PCDFs overall.

- Based on Event #2, Attempt #2 (primary and duplicate samples), the HSM sample collection method had at least 10% more positive results for COPC/COPECs than the LSM and whole water sample collection methods.

Overall, the recommended sample collection method(s), if any, based on the results of the Phase I evaluation criteria (Steps 1 to 4) for PCDDs/PCDFs is summarized in Table 5-2 below.

Table 5-2
Recommended Sample Collection Method – PCDDs/PCDFs

	Event #1, Attempt #3	**Event #2, Attempt #2**
Primary Sample	Inconclusive	HSM
Duplicate Sample	LSM/ HSM	HSM

5.2.2 Polychlorinated Biphenyl Congeners

All three sample collection and processing methods (LSM, HSM, and whole water) were evaluated for the PCB congeners analytical group. Samples were collected for PCB congener analysis during Event #1, Attempt #3 and Event #2, Attempt #2. A summary of the findings of evaluation Steps 3 and 4 for PCB Congener data are provided below. The detailed evaluation sheets (Worksheet #11) can be found in Appendix B.

- Based on Event #1, Attempt #3 (duplicate samples), the HSM sample collection method had at least 10% more positive results for COPC/COPECs than the LSM and whole water sample collection methods. The results for the primary sample showed both HSM and LSM sample collection methods had at least 10% more positive results for COPC/COPECs than the whole water sample collection method; however, the HSM sample collection method also had at least 10% more positive results for PCB congeners overall.

- Based on Event #2, Attempt #2 (primary samples), the HSM sample collection method had at least 10% more positive results for COPC/COPECs than the LSM and whole water sample collection methods. The results for the duplicate samples showed both HSM and LSM sample collection methods had at least 10% more positive results for COPC/COPECs than the whole water sample collection method; however, the HSM sample collection method also had at least 10% more positive results for PCB congeners overall.

Overall, the recommended sample collection method(s), if any, based on the results of the Phase I evaluation criteria (Steps 1 to 4) for PCB congeners is summarized in Table 5-3 below.

Table 5-3
Recommended Sample Collection Method – PCB Congeners

	Event #1, Attempt #3	Event #2, Attempt #2
Primary Sample	HSM	HSM
Duplicate Sample	HSM	HSM

5.2.3 Aroclor Polychlorinated Biphenyls

All three sample collection and processing methods (LSM, HSM, and whole water) were evaluated for the Aroclor PCBs analytical group. Samples were collected for Aroclor PCB analysis during Event #1, Attempt #2 and Event #2, Attempt #2. A summary of the findings of evaluation Steps 3 and 4 for Aroclor PCB data are provided below. The detailed evaluation sheets (Worksheet #11) can be found in Appendix C.

- Based on Event #1, Attempt #2 (primary and duplicate samples), the HSM sample collection methods had at least 10% more positive results for COPC/COPECs than the LSM and whole water sample collection methods.

- Based on Event #2, Attempt #2 (duplicate samples), the HSM sample collection method had at least 10% more positive results for COPC/COPECs than the LSM and whole water sample collection methods. This was not observed in the results for the primary samples, no sample collection method resulted in at least 10% more positive results for COPC/COPECs or Aroclor PCBs overall.

Overall, the recommended sample collection method(s), if any, based on the results of the Phase I evaluation criteria (Steps 1 to 4) for PCB congeners is summarized in Table 5-3 below.

Table 5-4
Recommended Sample Collection Method – Aroclor PCBs

	Event #1, Attempt #2	Event #2, Attempt #2
Primary Sample	HSM	inconclusive
Duplicate Sample	HSM	HSM

5.2.4 Organochlorine Pesticides

All three sample collection and processing methods (LSM, HSM, and whole water) were evaluated for the organochlorine pesticide analytical group. Samples were collected for organochlorine pesticides analysis during Event #1, Attempt #2 and Event #2, Attempt #2. A summary of the findings of evaluation Steps 3 and 4 for organochlorine pesticide data is provided below. The detailed evaluation sheets (Worksheet #11) can be found in Appendix D.

- Based on Event #1, Attempt #2 (duplicate samples), the HSM sample collection method had at least 10% more positive results for COPC/COPECs than the LSM and whole water sample collection methods. This was not observed in the results for the primary samples, no sample collection method resulted in at least 10% more positive results for COPC/COPECs or organochlorine pesticides overall (note the HSM sample collection method for the primary sample was not considered, as the HSM particulate sample was rejected due to data usability issues).

- Based on Event #2, Attempt #2 (primary samples), the HSM sample collection method had at least 10% more positive results for COPC/COPECs than the LSM and whole water sample collection method. This was not observed in the results for the primary samples; no sample collection method resulted in at least 10% more positive results for COPC/COPECs or organochlorine pesticides overall.

Overall, the recommended sample collection method(s), if any, based on the results of the Phase I evaluation criteria (Steps 1 to 4) for organochlorine pesticides is summarized in Table 5-5 below.

Table 5-5
Recommended Sample Collection Method – Organochlorine Pesticides

	Event #1, Attempt #2	**Event #2, Attempt #2**
Primary Sample	Inconclusive	HSM
Duplicate Sample	HSM	inconclusive

5.2.5 Semivolatile Organic Compounds

All three sample collection and processing methods (LSM, HSM, and whole water) were evaluated for the SVOC analytical group. Samples were collected for SVOC analysis during Event #1, Attempt #2 and Event #2, Attempt #2. A summary of the findings of evaluation Steps 3 and 4 for SVOC data are provided below. Note there are no COPECs that are SVOCs. The detailed evaluation sheets (Worksheet #11) can be found in Appendix E.

- Based on Event #1, Attempt #2 (primary and duplicate samples), no sample collection method resulted in at least 10% more positive results for SVOCs overall (note that three samples were rejected due to data usability issue).

- Based on Event #2, Attempt #2 (primary samples), the HSM sample collection method had at least 10% more positive results for SVOCs overall than the LSM and whole water sample collection methods. This was not observed in the results for the duplicate samples; no sample collection method resulted in at least 10% more positive results for SVOCs overall.

Overall, the recommended sample collection method(s), if any, based on the results of the Phase I evaluation criteria (Steps 1 to 4) for organochlorine pesticides is summarized in Table 5-6 below.

Table 5-6
Recommended Sample Collection Method – SVOCs

	Event #1, Attempt #2	**Event #2, Attempt #2**
Primary Sample	Inconclusive	HSM
Duplicate Sample	Inconclusive	Inconclusive

5.2.6 Semivolatile Organic Compounds Select Ion Monitoring

All three sample collection and processing methods (LSM, HSM, and whole water) were evaluated for the SVOC SIM analytical group. Samples were collected for SVOC SIM analysis during Event #1, Attempt #2 and Event #2, Attempt #2. A summary of the findings of evaluation Steps 3 and 4 for SVOC data are provided below. The detailed evaluation sheets (Worksheet #11) can be found in Appendix F.

- Based on Event #1, Attempt #2 (primary samples), the LSM and HSM sample collection methods had at least 10% more positive results for COPC/COPECs than the whole water sample collection method. Neither LSM nor HSM sample collection methods had at least 10% more positive results for SVOC SIM overall. This was not observed in the results for the duplicate samples; no sample collection method resulted in at least 10% more positive results for COPC/COPECs.

- Based on Event #2, Attempt #2 (primary and duplicate samples), no sample collection method resulted in at least 10% more positive results for COPC/COPECs or SVOCs SIM overall.

Overall, the recommended sample collection method(s), if any, based on the results of the Phase I evaluation criteria (Steps 1 to 4) for SVOCs SIM is summarized in Table 5-7 below.

Table 5-7
Recommended Sample Collection Method – SVOCs SIM

	Event #1, Attempt #2	Event #2, Attempt #2
Primary Sample	LSM/HSM	inconclusive
Duplicate Sample	inconclusive	inconclusive

5.2.7 Chlorinated Herbicides

All three sample collection and processing methods (LSM, HSM, and whole water) were evaluated for the chlorinated herbicides analytical group. Samples were collected for chlorinated herbicide analysis during Event #1, Attempt #2; Event #1, Attempt #3; and Event #2, Attempt #2. Three sets of samples were collected due to a laboratory error identified during the herbicide analysis of the HSM particulate sample from Event #2, Attempt #2. The HSM particulate herbicide results indicated that a laboratory control sample associated with the herbicide data had failed. In an attempt to produce results that would be free of qualification, the laboratory was asked to re-extract and re-analyze the sample. The laboratory reported that the remaining HSM particulate sample had developed a mold growth on the surface of the sample. It was decided that the presence of this mold could pose data quality issues; therefore, it was suggested to the USEPA that additional chlorinated herbicide samples be collected during the next sampling event (Event #1, Attempt #3). This was approved by USEPA in an email correspondence on February 20, 2014. Data from all three sampling events/attempts has have been used in this evaluation. A summary of the findings of evaluation Steps 3 and 4 for chlorinated herbicides data are provided below. Note there are no COPECs that are chlorinated herbicides. The detailed evaluation sheets (Worksheet #11) can be found in Appendix G.

It should be noted that many of the positive chlorinated herbicide results were qualified as tentatively identified at an estimated concentration (NJ). This is a reflection of a larger than acceptable level of uncertainty as to both the qualitative identification of the analyte and the numerical value reported. Across all sample types collected during the three sampling events/attempts, 29 positive chlorinated herbicide results were reported. Of those 29 positive results, 16 were assigned an “NJ” flag during validation.

- Based on Event #1, Attempt #2 (primary samples), the LSM sample collection method had at least 10% more positive results for chlorinated herbicides overall than the HSM and whole water sample collection methods. For the duplicate samples, the LSM and HSM sample collection methods resulted in at least 10% more positive results for chlorinated herbicides overall than the whole water sample collection method.

- Based on Event #1, Attempt #3 (primary samples), the HSM and whole water sample collection methods resulted in at least 10% more positive results for chlorinated herbicides overall than the LSM

sample collection method. For the duplicate samples, the LSM and whole water sample collection methods resulted in at least 10% more positive results for chlorinated herbicides overall than the HSM sample collection method.

- Based on Event #2, Attempt #2 (primary samples), the HSM sample collection method resulted in at least 10% more positive results for chlorinated herbicides overall than the LSM and whole water sample collection methods. For the duplicate samples, the LSM sample collection method resulted in at least 10% more positive results for chlorinated herbicides overall than the HSM and whole water sample collection methods.

Overall, the recommended sample collection method(s), if any, based on the results of the Phase I evaluation criteria (Steps 1 to 4) for chlorinated herbicides is summarized in Table 5-8 below.

Table 5-8
Recommended Sample Collection Method – Chlorinated Herbicides

	Event #1, Attempt #2	**Event #1, Attempt #3**	**Event #2, Attempt #2**
Primary Sample	LSM	HSM/whole water	HSM
Duplicate Sample	LSM/HSM	LSM/whole water	LSM

5.2.8 Cyanide

As per the QAPP (Tierra 2013), only HSM and whole water sample collection methods were evaluated for the cyanide analytical group since only whole water sample collection (and not LSM sample collection) were included in the CSO/SWO S&AP.

Samples were collected for cyanide analysis during Event #1, Attempt #2 and Event #2, Attempt #2. Following are A summary of the findings of evaluation Steps 3 and 4 for cyanide data are provided below. Note cyanide is not a COPEC. The detailed evaluation sheets (Worksheet #11) can be found in Appendix H.

- Based on Event #1, Attempt #2 and Event #2, Attempt #2 (primary and duplicate samples), cyanide data exhibited positive results for the analyte in the samples collected using HSM and whole water sample collection methods. Therefore, the recommended sample collection method(s) based on the Phase I evaluation criteria is inconclusive.

5.2.9 Volatile Organic Compounds

As per the QAPP (Tierra 2013), only whole water and HSM sample collection and processing methods were evaluated for the VOC analytical group since only whole water sample collection (and not LSM sample

collection) were included in the CSO/SWO S&AP. Samples were collected for VOC analysis during Event #1, Attempt #2 and Event #2, Attempt #1. However, samples collected using the HSM sample collection method were rejected due to data usability issues. Therefore, only data for samples collected via the whole water samples collection method were considered usable. The detailed evaluation sheets (Worksheet #11) can be found in Appendix I.

5.2.10 Total Extractable Petroleum Hydrocarbons

As per the QAPP (Tierra 2013), only whole water and HSM sample collection and processing methods were evaluated for the TEPH analytical group since only whole water sample collection (and not LSM sample collection) were included in the CSO/SWO S&AP. Samples were collected for TEPH analysis during Event #1, Attempt #2 and Event #2, Attempt #2. A summary of the findings of evaluation Steps 3 and 4 for TEPH data are provided below. Note TEPH is not a COPEC. The detailed evaluation sheets (Worksheet #11) can be found in Appendix J.

- Based on Event #1, Attempt #2 and Event #2, Attempt #2 (primary and duplicate samples), TEPH data exhibited positive results for the analyte in the samples collected using both the HSM and whole water sample collection methods. Therefore, the recommended sample collection method(s) based on the Phase I evaluation criteria is inconclusive.

6. Conclusion/Recommendation

Based on the Phase I evaluation process, the recommended sample collection methods per analytical group are identified below in Table 6-1. The HSM sample collection method is the preferred approach for certain hydrophobic contaminants, such as PCDDs/PCDFs, PCB congeners, Aroclor PCBs, and organochlorine pesticides. For PCB congeners, HSM was the recommended sample collection method for each sample collected (primary and duplicate) based on the Phase I evaluation process. For PCDDs/PCDFs, Aroclor PCBs, and organochlorine pesticides, HSM was the recommended sample collection method for half or more of the samples collected (primary and duplicate) based on the Phase I evaluation process. A preferred sample collection method for the remaining analytical groups was not definitive.

Table 6-1
Phase I Sample Collection Method Recommendations

Sample Collection Technique	PCDD/ PCDF	PCB Congeners	Aroclor PCBs	Organochlorine Pesticides	SVOC	SVOC SIM	Chlorinated Herbicides	Cyanide	VOC	TEPH
LSM					O	O	O	O	O	O
HSM	✓	✓	✓	✓						
Whole Water										

Notes:
✓ = selected sampling method

O = recommended sample collection method inconclusive

Based on the results of the Phase I evaluation discussed in this report, it is recommended that a hybrid sample collection program be implemented for Phase II. Such hybrid approach would focus on using the most appropriate sampling technique for each applicable parameter group. It is also recommended that Phase II be implemented in additional phases to continue to collect data and make adjustments (if needed) to meet program objectives. Given the number of additional sampling locations remaining to be sampled (8 CSOs, 10 SWOs, and one POTW sample [quarterly basis for 1 year]) during Phase II, an iterative evaluation of the Phase II data will allow flexibility in making adjustments to the program and help avoid collection of a large amount of data that do not meet program objectives.

Tierra recommends a meeting with USEPA to review the results of the Phase I evaluation and develop the approach and scope for the Phase II CSO/SWO investigation program that considers factors including sampling technique, implementability, data needs, locations and schedule.

7. References

Great Lakes Environmental Center. 2008. New York-New Jersey Harbor Estuary Program Contaminant Assessment and Reduction Program. New Jersey Toxics Reduction Work Plan Study I-G Project Report, February 2008.

Malcolm Pirnie, Inc. 2008. Rain Event Program Narrative, Lower Passaic River Restoration Project (version 11/05/2008) Source: www.ourPassaic.org.

The Louis Berger Group (in conjunction with Battelle HDR/HydroQual). Lower Eight Miles of the Lower Passaic River. Focused Feasibility Report. For U. S. Environmental Protection Agency, Region 2 and U.S. Army Corps of Engineers, Kansas City District.

Tierra Solutions, Inc. 2002. Remedial Investigation – Combined Sewer Overflow Investigation, Volume 1, Work Plan/Field Sampling Plan. May.

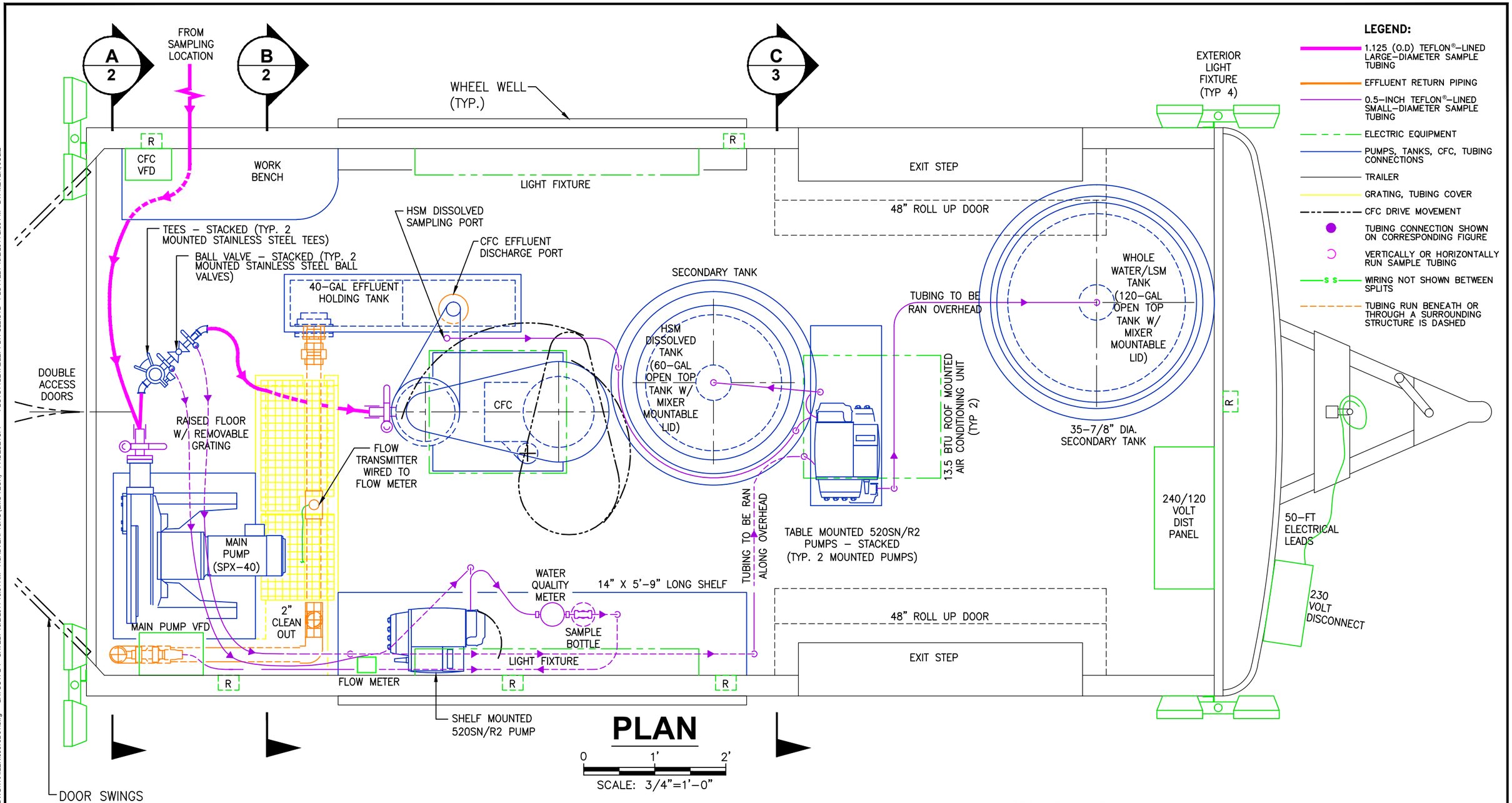
Tierra. 2013. Combined Sewer Overflow/Stormwater Outfall Investigation Quality Assurance Project Plan. Lower Passaic River Study Area. Revision 3. September 2013.

United States Environmental Protection Agency (USEPA). 1996. Method 1669, Sampling Ambient Water for Trace Metals at EPA Water Criterion Levels, U.S. Environmental Protection Agency, Office of Water Engineering and Analysis Division (4303), July 1996.

USEPA. 2008. Combined Sewer Overflow/Stormwater Overflow Sampling and Analytical Plan, Revision No. 2.0. August.

USEPA. 2014. Email Correspondence approving additional chlorinated herbicide samples. February 20.

Figures



NOTES:

1. CSO/SWO SAMPLING TRAILER SCHEMATIC BASE MAP RECEIVED FROM GROUNDWATER TREATMENT AND TECHNOLOGY, INC. OF DENVILLE, NJ ON FEBRUARY 7, 2013. (GWTT FILE # 11-2092)
2. DETACHABLE EXTERIOR LIGHT FIXTURES MUST BE REMOVED DURING TRANSPORT.
3. AUXILIARY TRAILER JACKS WILL BE MOUNTED TO LEVEL THE TRAILER AND CFC. BUBBLE LEVELS ARE MOUNTED TO THE OUTSIDE OF THE TRAILER TO ASSIST WITH LEVELING.
4. 50-FT ELECTRICAL LEADS WILL BE ATTACHED TO A PORTABLE 20-KW DIESEL GENERATOR CAPABLE OF PRODUCING THREE-PHASE 240V POWER SOURCE.
5. THE HSM AND LSM TANKS WILL BE FITTED WITH TEFLON® TANK LINERS FOR SAMPLE COLLECTION. ICE WILL BE PLACED BETWEEN THE TANK AND SECONDARY CONTAINMENT TANKS FOR SAMPLE PRESERVATION.
6. DETACHABLE MIXER (PNEUMATIC) WILL BE MOUNTED TO THE HSM AND LSM TANK LIDS DURING SUB-SAMPLING.

BTU = BRITISH THERMAL UNIT
CSO/SWO = COMBINED SEWER OVERFLOW/STORM WATER OUTFALL
CFC = CONTINUOUS FLOW CENTRIFUGE
HSM = HIGH-SOLIDS MASS
LSM = LOW-SOLIDS MASS
R = RECEPTACLE (12V ELECTRIC)
TYP = TYPICAL
VFD = VARIABLE FREQUENCY DRIVE

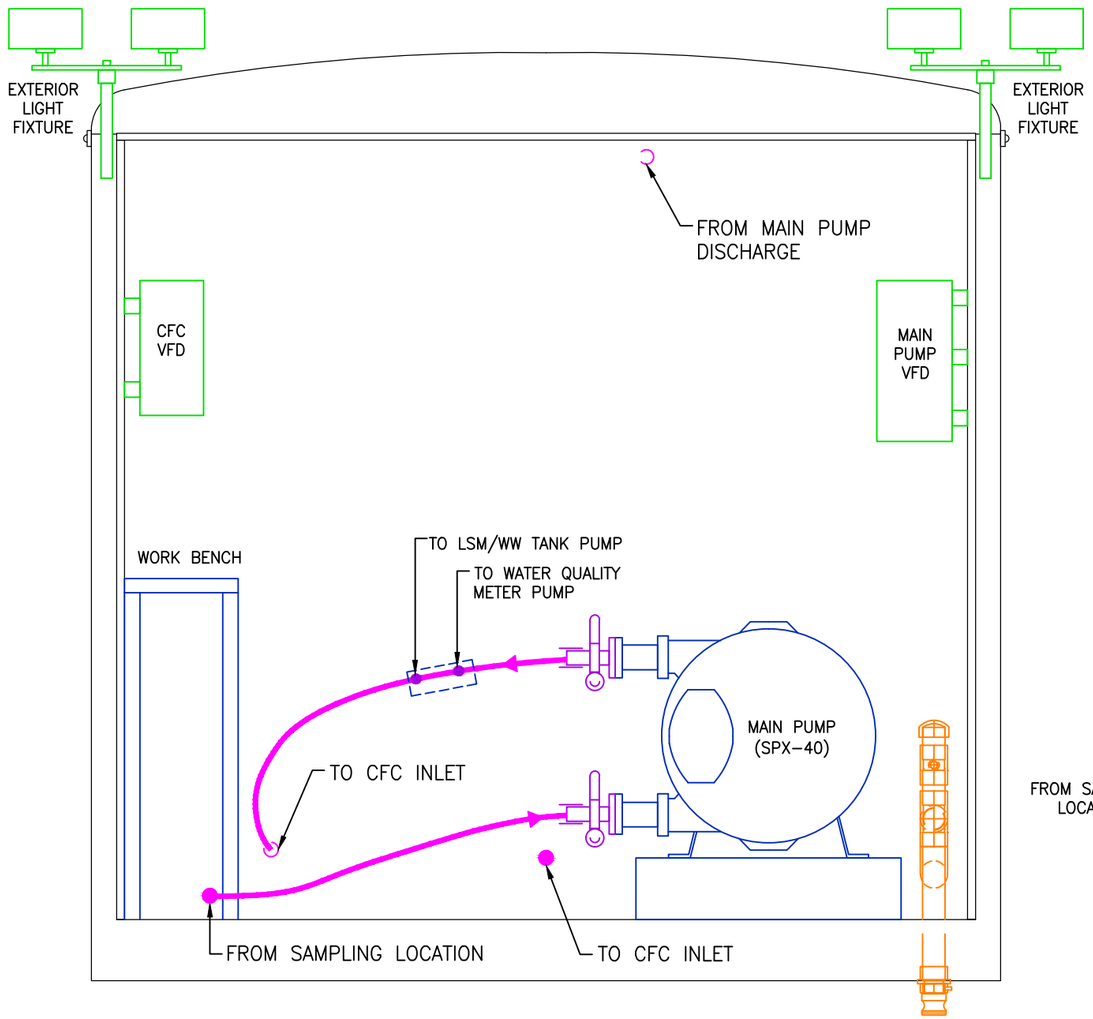
LOWER PASSAIC RIVER STUDY AREA
CSO/SWO INVESTIGATION PHASE I EVALUATION/RECOMMENDATION REPORT

CSO/SWO SAMPLE COLLECTION SYSTEM AND TRAILER SCHEMATIC

OCTOBER 2013

FIGURE **2-1**

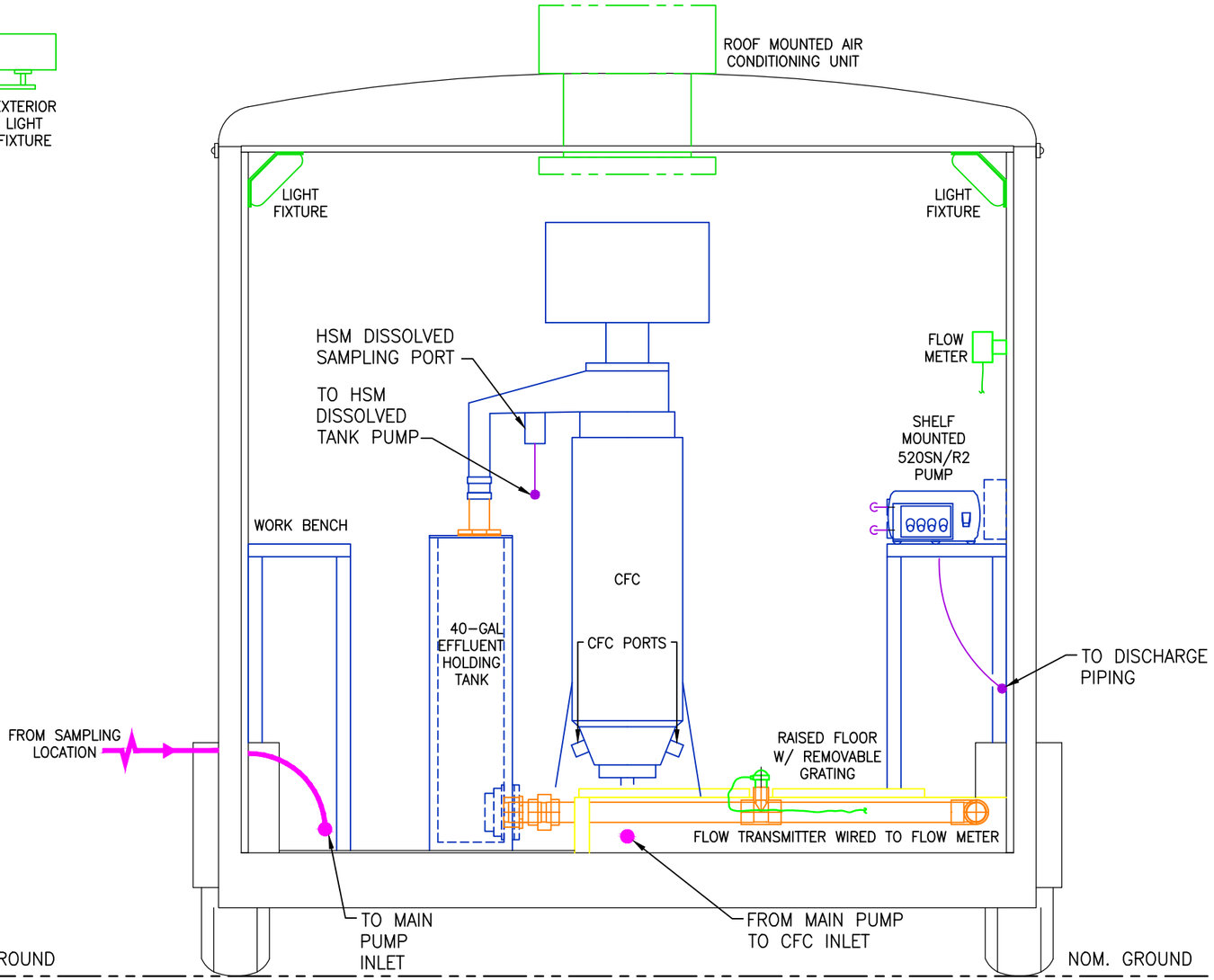
CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: L.POSENAUER LD:(Opt) PIC:(Opt) PM: M.HAYES TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
P:\ENVCAD\SYRACUSE\ACTIVITY\B0009979\0009\0002\DWG\TRAILER\09979D01.dwg LAYOUT: 2-1 SAVED: 10/2/2014 10:54 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 10/2/2014 2:36 PM BY: MEYER, JULIE
XREFS:
IMAGES:
09979X00



SECTION A

0 1' 2'

SCALE: 3/4"=1'-0"



SECTION B

0 1' 2'

SCALE: 3/4"=1'-0"

LEGEND:

- 1.125 (O.D) TEFLON®-LINED LARGE-DIAMETER SAMPLE TUBING
- EFFLUENT RETURN PIPING
- 0.5-INCH TEFLON®-LINED SMALL-DIAMETER SAMPLE TUBING
- ELECTRIC EQUIPMENT
- PUMPS, TANKS, CFC, TUBING CONNECTIONS
- TRAILER
- GRATING, TUBING COVER
- CFC DRIVE MOVEMENT
- TUBING CONNECTION SHOWN ON CORRESPONDING FIGURE
- VERTICALLY OR HORIZONTALLY RUN SAMPLE TUBING
- S S WIRING NOT SHOWN BETWEEN SPLITS
- TUBING RUN BENEATH OR THROUGH A SURROUNDING STRUCTURE IS DASHED

BTU = BRITISH THERMAL UNIT

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CFC = CONTINUOUS FLOW CENTRIFUGE

HSM = HIGH-SOLIDS MASS

LSM = LOW-SOLIDS MASS

R = RECEPTACLE (12V ELECTRIC)

TYP = TYPICAL

VFD = VARIABLE FREQUENCY DRIVE

NOTES:

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2. DETACHABLE EXTERIOR LIGHT FIXTURES MUST BE REMOVED DURING TRANSPORT.
3. AUXILIARY TRAILER JACKS WILL BE MOUNTED TO LEVEL THE TRAILER AND CFC. BUBBLE LEVELS ARE MOUNTED TO THE OUTSIDE OF THE TRAILER TO ASSIST WITH LEVELING.
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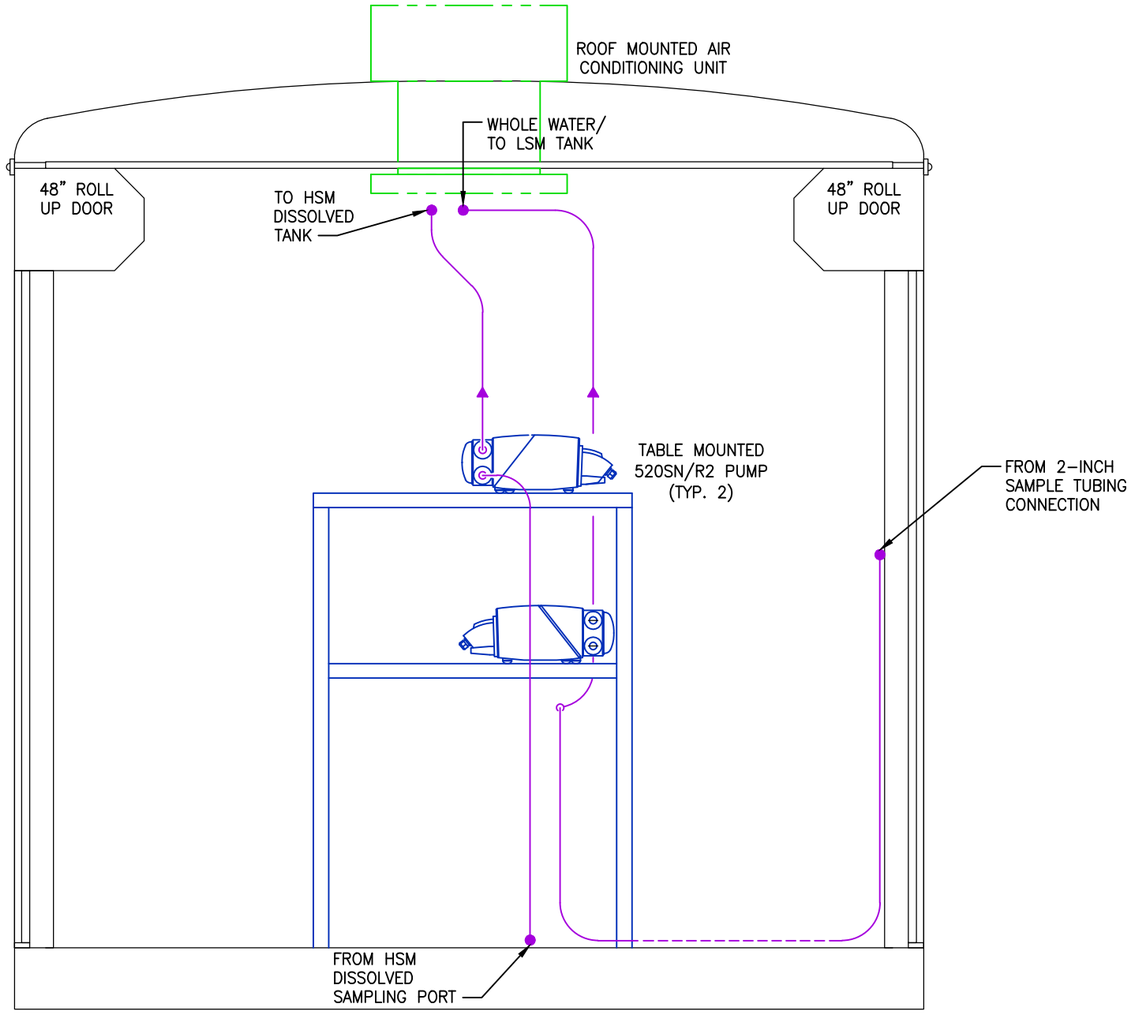
6. DETACHABLE MIXER (PNEUMATIC) WILL BE MOUNTED TO THE HSM AND LSM TANK LIDS DURING SUB-SAMPLING.

LOWER PASSAIC RIVER STUDY AREA
CSO/SWO INVESTIGATION PHASE I EVALUATION/RECOMMENDATION REPORT

CSO/SWO SAMPLE COLLECTION SYSTEM AND TRAILER SCHEMATIC - CROSS-SECTIONS A AND B

OCTOBER 2013

FIGURE **2-2**



SECTION C/1

0 1' 2'

SCALE: 3/4"=1'-0"

LEGEND:

- 1-INCH TEFLON®-LINED SAMPLE TUBING
- EFFLUENT RETURN PIPING
- 0.5-INCH TEFLON®-LINED SAMPLE TUBING
- ELECTRIC EQUIPMENT
- PUMPS, TANKS, CFC, TUBING CONNECTIONS
- TRAILER
- CFC DRIVE MOVEMENT
- TUBING CONNECTION SHOWN ON CORRESPONDING FIGURE
- VERTICALLY OR HORIZONTALLY RUN SAMPLE TUBING
- S S WIRING NOT SHOWN BETWEEN SPLITS
- TUBING RUN BENEATH OR THROUGH A SURROUNDING STRUCTURE IS DASHED

BTU = BRITISH THERMAL UNIT

CSO/SWO = COMBINED SEWER OVERFLOW/STORM WATER OUTFALL

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6. DETACHABLE MIXER (PNEUMATIC) WILL BE MOUNTED TO THE HSM AND LSM TANK LIDS DURING SUB-SAMPLING.

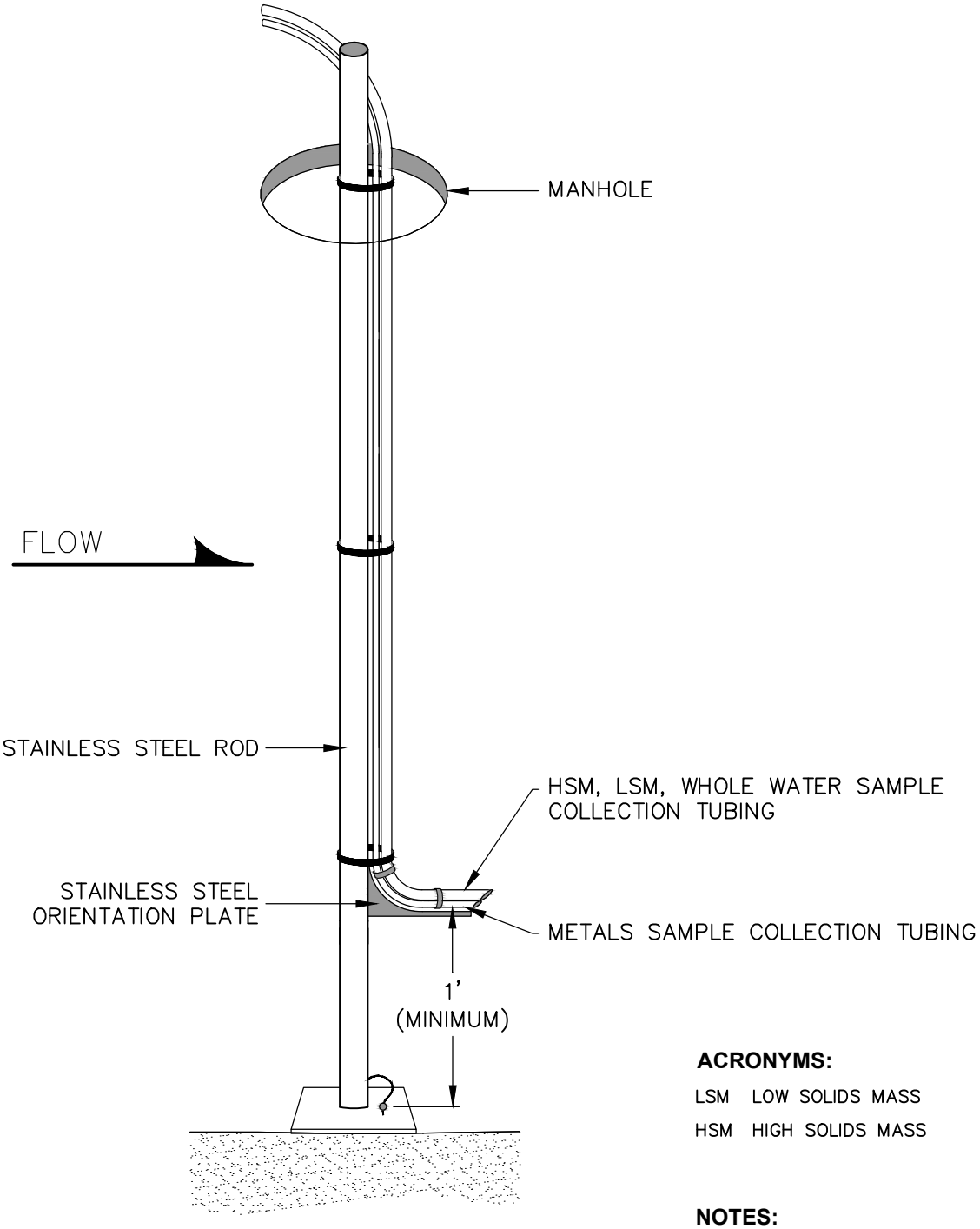
LOWER PASSAIC RIVER STUDY AREA
CSO/SWO INVESTIGATION PHASE I EVALUATION/RECOMMENDATION REPORT

CSO/SWO SAMPLE COLLECTION SYSTEM AND TRAILER SCHEMATIC - CROSS-SECTION C

OCTOBER 2013

FIGURE **2-3**

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: L.POSENAUER LD:(Opt) PIC:(Opt) PM: M.HAYES TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
P:\ENVCAD\SYRACUSE\ACTIB\00099790009\00002\DWG\TRAILER\09979D01.dwg LAYOUT: 2-3 SAVED: 10/2/2014 10:54 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 10/2/2014 2:36 PM BY: MEYER, JULIE (LMS TECH)
XREFS:
IMAGES:
09979X00



ACRONYMS:

LSM LOW SOLIDS MASS

HSM HIGH SOLIDS MASS

NOTES:

1. EQUIPMENT SIZES ARE APPROXIMATE.
2. FIGURE FOR VISUAL AID ONLY.

NOT TO SCALE

LOWER PASSAIC RIVER STUDY AREA
CSO/SWO INVESTIGATION PHASE I
EVALUATION / RECOMMENDATION REPORT

SCHEMATIC OF WEIGHTED ROD/TUBING ASSEMBLY

OCTOBER 2013 | **2-4**

Appendix A

Detailed Evaluation Sheets
(Worksheet #11) –
PCDDs/PCDFs

EVENT 2 ORIGINAL SAMPLE - DIOXIN

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCDD/PCDF Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 2 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/ COPECs[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly different?
	Attempt 1	Attempt 2	Attempt 3				
Whole water	No	Yes	NA	Yes	7	Yes	NA
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	4	Yes	NA
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	14	No	NA
LSM dissolved	No	Yes	NA	Yes	3	Yes	NA
HSM dissolved	No	Yes	NA	Yes	12		NA
LSM particulate	No	Yes	NA	Yes	4	Yes	NA
HSM particulate	No	Yes	NA	Yes	13		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[e]

Analyte Identified	Whole Water (pg/L)	LQ[f]	VQ	LSM Dissolved (pg/L)	LQ[f]	VQ	HSM Dissolved (pg/L)	LQ[f]	VQ	% RPD	LSM Particulate (pg/g)	LQ[f]	VQ	HSM Particulate (pg/g)	LQ[f]	VQ	% RPD
1,2,3,4,7,8-HxCDD	0.801	G					0.606	G	J					6.32		J	
1,2,3,6,7,8-HxCDD	2.56	G					1.79	G	J		156	G		21.1		J	**152**
1,2,3,7,8,9-HxCDD	1.74	G	J	0.530	G	J	1.22	G	J	**78.9**	114	G		15.2		J	**153**
1,2,3,4,6,7,8-HpCDD	84.3		J	11.0		J	38.5		J	**111**	4920			700		J	**150**
OCDD	1090			73.2		J	338		J	**129**	64000		J	9590	E	J	**148**
2,3,7,8-TCDF														3.82		M	
1,2,3,7,8-PeCDF														4.41	G	M	
2,3,4,7,8-PeCDF	0.537	G					0.288	G						4.04	G	M	
1,2,3,4,7,8-HxCDF							1.23	G									
1,2,3,6,7,8-HxCDF							1.45	G						11.7		M	
2,3,4,6,7,8-HxCDF	1.72	G					1.10	G						10.5		M	
1,2,3,4,6,7,8-HpCDF							17.3		J					205		J	
1,2,3,4,7,8,9-HpCDF							1.58	G						13.3		J	
OCDF							42.3		J					444		J	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: 2,3,7,8-TCDD; 1,2,3,7,8-PeCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,4,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,6,7,8-HpCDD; OCDD; 2,3,7,8-TCDF; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 1,2,3,6,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 1,2,3,4,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8,9-HpCDF; and OCDF.

[d] Fewer than 2

[e] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[f] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCDD/PCDF = polychlorinated dibenzo-p-dioxin/polychlorinated dibenzofuran
pg/g = picoograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 FIELD DUPLICATE - DIOXIN

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCDD/PCDF Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 2 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/ COPECs[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly different?
	Attempt 1	Attempt 2	Attempt 3				
Whole water	No	Yes	NA	Yes	8	Yes	NA
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	11	Yes	NA
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	15	No	NA
LSM dissolved	No	Yes	NA	Yes	5	Yes	NA
HSM dissolved	No	Yes	NA	Yes	10		NA
LSM particulate	No	Yes	NA	Yes	9	Yes	NA
HSM particulate	No	Yes	NA	Yes	14		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[e]

Analyte Identified	Whole Water (pg/L)	LQ[f]	VQ	LSM Dissolved (pg/L)	LQ[f]	VQ	HSM Dissolved (pg/L)	LQ[f]	VQ	% RPD	LSM Particulate (pg/g)	LQ[f]	VQ	HSM Particulate (pg/g)	LQ[f]	VQ	% RPD
1,2,3,7,8-PeCDD											18.1	G		3.98	G	J	**128**
1,2,3,4,7,8-HxCDD	0.893	G	J	0.535	G	J	0.505	G	J	**5.77**				6.16		J	
1,2,3,6,7,8-HxCDD	2.76		J	0.548	G	J					106	G		19.8		J	**137**
1,2,3,7,8,9-HxCDD	1.94	G	J				1.35	G	J		81.8	G		14.2		J	**141**
1,2,3,4,6,7,8-HpCDD	87.4		J	8.92		J	30.5		J	**109**	3160			636		J	**133**
OCDD	1230		J	64.7		J	199		J	**102**	43100			9560	E	J	**127**
2,3,7,8-TCDF														2.88		M	
1,2,3,7,8-PeCDF											11.1	G		4.04	G	M	**93.3**
2,3,4,7,8-PeCDF											11.8	G		4.23	G	M	**94.4**
1,2,3,4,7,8-HxCDF							0.959	G									
1,2,3,6,7,8-HxCDF	2.11	G					1.08	G			61.9	G		11.1		M	**139**
2,3,4,6,7,8-HxCDF	1.94	G					0.962	G			74.6	G		7.89		M	**162**
1,2,3,4,6,7,8-HpCDF							13.4		J					197		J	
1,2,3,4,7,8,9-HpCDF	2.61			0.515	G	J	1.20	G		**79.9**				12.5		J	
OCDF							32.5		J					458		J	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: 2,3,7,8-TCDD; 1,2,3,7,8-PeCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,4,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,6,7,8-HpCDD; OCDD; 2,3,7,8-TCDF; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 1,2,3,6,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 1,2,3,4,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8,9-HpCDF; and OCDF.

[d] Fewer than 2

[e] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[f] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

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pg/g = picoograms per gram
pg/L = picograms per liter
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EVENT 1 ATTEMPT 3 ORIGINAL SAMPLE - DIOXIN

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Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCDD/PCDF Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
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	Attempt 1	Attempt 2	Attempt 3				
Whole water	Yes	NA	Yes	Yes	14	No	No
LSM dissolved plus LSM particulate	Yes	NA	Yes	Yes	15	No	No
HSM dissolved plus HSM particulate	Yes	NA	Yes	Yes	15	No	No
LSM dissolved	Yes	NA	Yes	Yes	6	Yes	NA
HSM dissolved	Yes	NA	Yes	Yes	12		NA
LSM particulate	Yes	NA	Yes	Yes	15	No	No
HSM particulate	Yes	NA	Yes	Yes	15		No

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[e]

Analyte Identified	Whole Water (pg/L)	LQ[f]	VQ	LSM Dissolved (pg/L)	LQ[f]	VQ	HSM Dissolved (pg/L)	LQ[f]	VQ	% RPD	LSM Particulate (pg/g)	LQ[f]	VQ	HSM Particulate (pg/g)	LQ[f]	VQ	% RPD
1,2,3,7,8-PeCDD	0.425	G	J								24.4	G		4.56			**137**
1,2,3,4,7,8-HxCDD	0.914	G					0.575	G	J		47.7	G		9.01			**136**
1,2,3,6,7,8-HxCDD	2.58			0.769	G	J	1.42	G	J	**59.5**	135	G		24.4			**139**
1,2,3,7,8,9-HxCDD	2.01	G					1.04	G	J		105	G		17.5			**143**
1,2,3,4,6,7,8-HpCDD	81.5			13		J	31.3		J	**82.6**	3750		J	746			**134**
OCDD	1060		J	74.9		J	226		J	**100**	45500		J	12000	D		**117**
2,3,7,8-TCDF							0.0775	G			18.9	G		3.85			**132**
1,2,3,7,8-PeCDF	0.304	G					0.131	G	J		12.6	G		3.53			**112**
2,3,4,7,8-PeCDF	0.85	G									43.6	G		4.77			**161**
1,2,3,4,7,8-HxCDF	1.8	G					0.976	G	J		80.8	G		14.9			**138**
1,2,3,6,7,8-HxCDF	1.81	G		0.56	G	J	1.07	G	J	**62.6**	92.3	G		13.9			**148**
2,3,4,6,7,8-HxCDF	1.75	G		0.402	G	J	0.924	G	J	**78.7**	95.9	G		9.96			**162**
1,2,3,4,6,7,8-HpCDF	29.1		J	5.81		J	15.3		J	**89.9**	1760			253			**150**
1,2,3,4,7,8,9-HpCDF	2.05	G									105	G		13.8			**154**
OCDF	53.7		J				26.8		J		3280			488			**148**

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: 2,3,7,8-TCDD; 1,2,3,7,8-PeCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,4,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,6,7,8-HpCDD; OCDD; 2,3,7,8-TCDF; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 1,2,3,6,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 1,2,3,4,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8,9-HpCDF; and OCDF.

[d] Fewer than 2

[e] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[f] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCDD/PCDF = polychlorinated dibenzo-p-dioxin/polychlorinated dibenzofuran
pg/g = picoograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 ATTEMPT 3 FIELD DUPLICATE - DIOXIN

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCDD/PCDF Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 2 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/ COPECs[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly different?
	Attempt 1	Attempt 2	Attempt 3				
Whole water	Yes	NA	Yes	Yes	13	Yes	NA
LSM dissolved plus LSM particulate	Yes	NA	Yes	Yes	15	No	No
HSM dissolved plus HSM particulate	Yes	NA	Yes	Yes	15	No	No
LSM dissolved	Yes	NA	Yes	Yes	6	Yes	NA
HSM dissolved	Yes	NA	Yes	Yes	12		NA
LSM particulate	Yes	NA	Yes	Yes	15	No	No
HSM particulate	Yes	NA	Yes	Yes	15		No

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[e]

Analyte Identified	Whole Water (pg/L)	LQ[f]	VQ	LSM Dissolved (pg/L)	LQ[f]	VQ	HSM Dissolved (pg/L)	LQ[f]	VQ	% RPD	LSM Particulate (pg/g)	LQ[f]	VQ	HSM Particulate (pg/g)	LQ[f]	VQ	% RPD
1,2,3,7,8-PeCDD	0.262	G									59.3	G		4.69			**171**
1,2,3,4,7,8-HxCDD	0.681	G					0.448	G			91.2	G		9.24			**163**
1,2,3,6,7,8-HxCDD	1.81	G		0.652	G	J	1.18	G		**57.6**	219	G		25.0			**159**
1,2,3,7,8,9-HxCDD	1.30	G		0.419	G	J	0.834	G		**66.2**	238	G		21.0			**168**
1,2,3,4,6,7,8-HpCDD	71.1			10.4		J	29.3		J	**95.2**	7400		J	818			**160**
OCDD	821		J	72.8		J	269		J	**115**	109000		J	11600	D		**162**
2,3,7,8-TCDF							0.0948	G						3.60			
1,2,3,7,8-PeCDF											18.3	G		3.22			**140**
2,3,4,7,8-PeCDF	0.438	G									56.9	G		4.21			**172**
1,2,3,4,7,8-HxCDF	1.34	G		0.412	G		0.893	G		**73.7**	93.4	G		14.4			**147**
1,2,3,6,7,8-HxCDF	1.32	G					0.885	G			116	G		14.2			**156**
2,3,4,6,7,8-HxCDF	1.09	G					0.793	G			118	G		105			**11.7**
1,2,3,7,8,9-HxCDF											19.4	G					
1,2,3,4,6,7,8-HpCDF	20.2		J				13				2230			247			**160**
1,2,3,4,7,8,9-HpCDF	1.47	G		0.548	G	J	1.01	G		**59.3**	123	G		14.4			**158**
OCDF	38		J				23.1		J		4070			469			**159**

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: 2,3,7,8-TCDD; 1,2,3,7,8-PeCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,4,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,6,7,8-HpCDD; OCDD; 2,3,7,8-TCDF; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 1,2,3,6,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 1,2,3,4,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8,9-HpCDF; and OCDF.

[d] Fewer than 2

[e] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[f] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCDD/PCDF = polychlorinated dibenzo-p-dioxin/polychlorinated dibenzofuran
pg/g = picoograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

Appendix B

Detailed Evaluation Sheets
(Worksheet #11) – PCB
Congeners

EVENT 2 ORIGINAL SAMPLE - PCB CONGENERS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCB Congener Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 17 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by asingle "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	6	Yes	NA
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	7	Yes	NA
HSM dissolved plus HSM partiulate	No	Yes	NA	Yes	9	No	NA
LSM dissolved	No	Yes	NA	Yes	3	No	No
HSM dissolved	No	Yes	NA	Yes	2		No
LSM particulate	No	Yes	NA	Yes	7	Yes	NA
HSM particulate	No	Yes	NA	Yes	9		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-1	14.1	D		13.4	D		18.4	D		**31.4**				204	D	M	
PCB-4/10														915	D	M	
PCB-6	26.6	D		13.6	DG		25.3	D		**60.2**				446	D	M	
PCB-16/32														1840	D	M	
PCB-17														1250	D	M	
PCB-18														2590	D	M	
PCB-19	28.3	D												420	D	M	
PCB-22														1140	D	J	
PCB-25														480	D	J	
PCB-26														701	D	J	
PCB-28														3310	D	J	
PCB-31														2970	D	J	
PCB-35				3.63	DG		7.07	DG		**64.3**	879	DG		204	D	M	**125**
PCB-36											478	DG		98.6	DG	M	**132**
PCB-40														718	D	M	
PCB-41/64/71/72														3360	D	M	
PCB-42/59														1210	D	J	
PCB-43/49														2970	D	J	
PCB-44														3890	D	M	
PCB-45														611	D	M	
PCB-46	9.49	DG		3.20	DG		9.59	DG		**99.9**	848	DG		303	D	M	**94.7**
PCB-48/75	22.3	D												677	D	M	
PCB-52/69														4780	D	J	
PCB-53														596	D	M	
PCB-55														90.2	DG	M	
PCB-56/60														2400	D	M	
PCB-57														26.9	DG	M	
PCB-58														16.6	DG	M	
PCB-61/70														4540	D	J	
PCB-63							4.20	DG			497	DG		153	D	J	**106**
PCB-67											383	DG		113	D	M	**109**
PCB-74														1450	D	J	
PCB-76/66														3020	D	J	
PCB-79				1.92	DG						420	DG					
PCB-81											450	DG					
PCB-82	46.1	D	J											1170	D	J	
PCB-84/92	129	D	J											3580	D	M	
PCB-85/116	48.9	D	J	10.5	D		25.6	D		**83.7**				1400	D	M	
PCB-87/117/125	117	D	J											3400	D	M	
PCB-88/91	40.6	D	J											1060	D	J	
PCB-89											393	DG		90.3	DG	M	**125**
PCB-90/101	309	D	J				189	D						8320	D	M	
PCB-94														37	DG	J	
PCB-95/98/102	211	D	J											5790	D	J	
PCB-96														65.5	DG	J	
PCB-97	95.4	D	J											2490	D	M	
PCB-99	114	D	J				66.0	D						3280	D	M	
PCB-100														27.6	DG	J	
PCB-103														52.5	D	J	
PCB-105	122	D	J											3350	D	M	
PCB-106/118	269	D	J											7890	D	M	
PCB-107/109	20.4	D	J	4.71	DG		10.8	D		**78.5**				503	D	J	

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-108/112	15.8	D	J	3.54	DG		9.84	DG		**94.2**	1110	DG		403	D	M	**93.5**
PCB-110	353	D	J											9800	D	M	
PCB-111/115							3.66	DG			544	DG		183	D	M	**99.3**
PCB-114	6.37	DG	J	1.96	DG						430	DG		175	D	M	**84.3**
PCB-119	7.55	DG	J				2.64	DG			424	DG		142	D	M	**99.6**
PCB-122				1.21	DG						261	DG		88.5	DG	M	**98.7**
PCB-123											590	DG		148	D	J	**120**
PCB-124	14.5	D	J	3.24	DG		7.76	DG		**82.2**	978	DG		379	D	J	**88.3**
PCB-126											529	DG		82.1	DG	M	**146**
PCB-128/162	60.0	D	J				27.8	D	J		4830	DG		1880	D	M	**87.9**
PCB-129	20.0	D	J	4.36	DG		9.54	DG	J	**74.5**	1330	DG		590	D	M	**77.1**
PCB-130	20.0	D	J	5.11	DG		10.4	D	J	**68.2**	1890	DG		666	D	M	**95.8**
PCB-132/161	90.7	D	J				42.2	D	J					2890	D	M	
PCB-133/142	11.1	D	J	2.27	DG						778	DG		304	D	M	**87.6**
PCB-134/143	18.4	D	J	4.27	DG									537	D	M	
PCB-135	40.1	D	J	8.76	DG		19.9	D		**77.7**				1180	D	M	
PCB-136														1110	D	M	
PCB-137	17.7	D	J	3.88	DG		11.7	D	J	**100**				460	D	M	
PCB-138/163/164	334	D	J				162	D	J					10100	D	M	
PCB-139/149	210	D	J											6730	D	M	
PCB-141	59.9	D	J											1870	D	M	
PCB-144				3.39	DG		8.35	DG		**84.5**	1380	DG		448	D	M	**102**
PCB-146/165	38.3	D	J											1140	D	M	
PCB-147											679	DG		170	D	M	**120**
PCB-151														1850	D	M	
PCB-153	265	D	J											7950	D	M	
PCB-154														74.8	DG	M	
PCB-155							3.19	DG									
PCB-156	37.4	D	J											1070	D	M	
PCB-157	11.7	D	J	2.30	DG		4.94	DG	J	**72.9**	1020	DG		269	D	M	**117**
PCB-158/160	39.1	D	J											1220	D	M	
PCB-166														59.5	D	M	
PCB-167	14.5	D	J	3.51	DG		7.68	DG	J	**74.5**	1110	DG		436	D	M	**87.2**
PCB-168														7.35	DG	M	
PCB-170	72.1	D	J											2600	D	M	
PCB-171	22.3	D	J											658	D	M	
PCB-172	15.3	D	J	3.55	DG		7.64	DG	J	**73.1**	1210	DG		444	D	M	**92.6**
PCB-173														69.9	DG	M	
PCB-174														2470	D	M	
PCB-175														116	D	M	
PCB-176														320	D	M	
PCB-177	43.3	D	J											1500	D	M	
PCB-178	17.8	D	J	4.67	DG						1530	DG		552	D	M	**93.9**
PCB-179														1150	D	M	

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-180														5600	D	M	
PCB-182/187														3410	D	M	
PCB-183														1440	D	M	
PCB-184				2.40	DG		7.92	DG	J	**107**	470	DG					
PCB-185				2.01	DG									317	D	M	
PCB-189											483	DG		116	D	M	**123**
PCB-190														468	D	M	
PCB-191				1.25	DG									93.1	DG	M	
PCB-193	9.42	DG	J	2.10	DG		3.98	DG	J	**61.8**	711	DG		283	D	M	**86.1**
PCB-194														1580	D	J	
PCB-195	15.8	D	J				6.95	DG	J		1180	DG		647	D	J	**58.3**
PCB-196/203														1840	D	M	
PCB-198														78.3	DG	M	
PCB-199	42.0	D	J											1940	D	M	
PCB-200														203	D	M	
PCB-201											517	DG		230	D	M	**76.8**
PCB-202											934	DG		450	D	M	**69.9**
PCB-206														2250	D	J	
PCB-207														238	D	J	
PCB-208														749	D	J	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: PCB -77, PCB -81, PCB -105, PCB -114, PCB -118, PCB -123, PCB -126, PCB -156, PCB -157, PCB -167, PCB -169, and PCB -189.

[d] At least 2

[e] Fewer than 17

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
pg/g = picograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 FIELD DUPLICATE - PCB CONGENERS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCB Congener Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 17 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by asingle "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	7	Yes	NA
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	8	No	No (62)
HSM dissolved plus HSM partiulate	No	Yes	NA	Yes	9	No	Yes (138)
LSM dissolved	No	Yes	NA	Yes	3	No	No
HSM dissolved	No	Yes	NA	Yes	3		No
LSM particulate	No	Yes	NA	Yes	8	No	Yes
HSM particulate	No	Yes	NA	Yes	9		Yes

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-1	19.9	D		16.7	D		19.3	D		**14.4**				192	D	M	
PCB-4/10														1080	D	M	
PCB-6	27.0	D		15.1	DG		25.7	D		**52.0**				639	D	M	
PCB-15														1430	D	M	
PCB-16/32														2250	D	M	
PCB-17														1670	D	M	
PCB-18														2970	D	M	
PCB-19	25.3	D												564	D	M	
PCB-20/21/33														2230	D	M	
PCB-22														1960	D	J	
PCB-25	24.8	D												4100	D	J	
PCB-26														2680	D	J	
PCB-28														15100	D	J	
PCB-31														9100	D	J	
PCB-35	8.56	DG					5.95	DG						242	D	M	
PCB-36											291	DG					
PCB-37														2050	D	J	
PCB-40														1030	D	M	
PCB-41/64/71/72														5090	D	M	
PCB-42/59														2380	D	J	
PCB-43/49														9130	D	J	
PCB-44														6390	D	M	
PCB-45														755	D	M	
PCB-46	12.3	D		4.28	DG		10.2	D	J	**81.8**	610	DG		450	D	M	**30.2**
PCB-47														5580	D	J	
PCB-48/75	24.4	D												1110	D	M	
PCB-51														522	D	J	
PCB-52/69														8660	D	J	
PCB-53														966	D	M	
PCB-54														47.2	D	M	
PCB-55	3.56	DG												103	D	M	
PCB-56/60														3320	D	M	
PCB-57														49.0	D	M	
PCB-61/70	172	D												7700	D	J	
PCB-63	5.64	DG									346	DG		670	D	J	**63.8**
PCB-67	3.19	DG												240	D	M	
PCB-68																	
PCB-74														3490	D	J	
PCB-76/66	118	D	J											7430	D	J	
PCB-77																	
PCB-79	3.49	DG		1.42	DG												
PCB-81											88.9	DG					
PCB-82	42.0	D									2770	DG		1470	D	M	**61.3**
PCB-84/92	114	D												4720	D	M	

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-85/116	47.1	D		11.4	D		24.1	D	J	**71.5**				1760	D	M	
PCB-87/117/125	113	D									7180	D		4290	D	M	**50.4**
PCB-88/91	37.0	D												1510	D	M	
PCB-89											275	DG		129	D	M	**72.3**
PCB-90/101	283	D					193	D	J					11200	D	M	
PCB-95/98/102	200	D												7820	D	M	
PCB-96	2.08	DG															
PCB-97	86.8	D												3250	D	M	
PCB-99	112	D					66.3	D	J					4780	D	M	
PCB-103	1.74	DG															
PCB-105	104	D									7470	D		4050	D	M	**59.4**
PCB-106/118	266	D					144	D	J		16800	D		10500	D	M	**46.2**
PCB-107/109	16.2	D		4.94	DG		10.9	D	J	**75.3**	1330	DG		750	D	M	**55.8**
PCB-108/112	13.4	D		3.30	DG		8.68	DG	J	**89.8**	980	DG		524	D	M	**60.6**
PCB-110	307	D												12300	D	M	
PCB-111/115	3.75	DG		1.77	DG						398	DG		192	D	M	**69.8**
PCB-114	6.56	DG		1.18	DG						471	DG		213	D	M	**75.4**
PCB-119	5.01	DG					3.14	DG	J		353	DG		240	D	M	**38.1**
PCB-122														110	D	M	
PCB-123							4.52	DG	J		432	DG		179	D	M	**82.8**
PCB-124	12.7	D					7.85	DG	J		850	DG		464	D	M	**58.8**
PCB-126	3.72	DG												95.7	D	M	
PCB-128/162	55.3	D					27.6	D	J		4140	D		2320	D	M	**56.3**
PCB-129	19.7	D		4.58	DG		10.8	D	J	**80.9**	1290	DG		741	D	M	**54.1**
PCB-130	19.9	D		4.45	DG		10.9	D	J	**84.0**	1560	DG		868	D	M	**57.0**
PCB-132/161	85.6	D					47.0	D	J		6000	D		3480	D	M	**53.2**
PCB-133/142	8.92	DG		2.27	DG		5.73	DG	J	**86.5**	597	DG		374	D	M	**45.9**
PCB-134/143	17.6	D		4.21	DG									689	D	M	
PCB-135	41.0	D		8.82	DG		20.3	D	J	**78.8**				1520	D	M	
PCB-136	34.5	D												1460	D	M	
PCB-137	13.7	D		3.78	DG		12.9	D	J	**109**				665	D	M	
PCB-138/163/164	313	D					166	D	J		20800	D		12300	D	M	**51.4**
PCB-139/149	206	D												8730	D	M	
PCB-140											215	DG					
PCB-141	62.9	D												2340	D	M	
PCB-144	11.9	D		3.98	DG		7.19	DG	J	**57.5**	852	DG		507	D	M	**50.8**
PCB-146/165	34.6	D												1400	D	M	
PCB-147														270	D	M	
PCB-151														2250	D	M	
PCB-153	243	D												9230	D	M	
PCB-154														123	D	M	
PCB-155	2.78	DG		1.40	DG		3.26	DG	J	**79.8**							
PCB-156	30.5	D									2280	DG		1350	D	M	**51.2**
PCB-157	7.79	DG		2.49	DG						720	DG		354	D	M	**68.2**
PCB-158/160	36.4	D												1520	D	M	
PCB-166														51.9	D	M	
PCB-167	13.8	D		2.85	DG		6.65	DG	J	**80.0**	968	DG		537	D	M	**57.3**
PCB-170	72.1	D									5490	D		2800	D	M	**64.9**
PCB-171	20.4	D									1560	DG		716	D	M	**74.2**
PCB-172	12.9	D		3.44	DG		7.93	DG	J	**79.0**	1060	DG		505	D	M	**70.9**
PCB-174														2680	D	M	

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-175														137	D	M	
PCB-176														352	D	M	
PCB-177	41.1	D									2990	DG		1590	D	M	**61.1**
PCB-178	17.9	D		3.77	DG		9.17	DG	J	**83.5**	1180	DG		653	D	M	**57.5**
PCB-179														1250	D	M	
PCB-180														6220	D	M	
PCB-182/187														3790	D	M	
PCB-183														1710	D	M	
PCB-184	7.15	DG		1.87	DG						291	DG					
PCB-185	9.38	DG					5.10	DG	J		725	DG		333	D	M	**74.1**
PCB-189														118	D	M	
PCB-190														552	D	M	
PCB-191	3.07	DG												113	D	M	
PCB-193	6.51	DG		1.81	DG						503	DG		276	D	M	**58.3**
PCB-194														1480	D	M	
PCB-195	13.8	D	J				8.01	DG	J					707	D	M	
PCB-196/203														1820	D	M	
PCB-197														66.9	DG	M	
PCB-198														95.2	DG	M	
PCB-199	36.6	D		8.24	DG									1750	D	M	
PCB-200														242	D	M	
PCB-201	5.85	DG									506	DG		227	D	M	**76.1**
PCB-202	11.1	D		2.41	DG						765	DG		410	D	M	**60.4**
PCB-206														1420	D	J	
PCB-208														441	D	J	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives

[c] COPCs/COPECs listed in the FFS: PCB -77, PCB -81, PCB -105, PCB -114, PCB -118, PCB -123, PCB -126, PCB -156, PCB -157, PCB -167, PCB -169, and PCB -189

[d] At least 2

[e] Fewer than 17

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate
Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
pg/g = picograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 ATTEMPT 3 ORIGINAL SAMPLE - PCB CONGENERS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCB Congener Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 17 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by asingle "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	NA	Yes	Yes	6	Yes	NA
LSM dissolved plus LSM particulate	Yes	NA	Yes	Yes	8	No	No (120)
HSM dissolved plus HSM partiulate	Yes	NA	Yes	Yes	9	No	Yes (153)
LSM dissolved	Yes	NA	Yes	Yes	2	Yes	NA
HSM dissolved	Yes	NA	Yes	Yes	6		NA
LSM particulate	Yes	NA	Yes	Yes	8	No	No
HSM particulate	Yes	NA	Yes	Yes	8		Yes

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-1														177	D, G	J	
PCB-4/10	135	D	J	120	D									1550	D	J	
PCB-5/8														2190	D	J	
PCB-6														810	D	J	
PCB-11														5120	D	J	
PCB-15														779	D	J	
PCB-16/32														2920	D	J	
PCB-17	130	D	J											2450	D	J	
PCB-18														2820	D	J	
PCB-19	53.8	D	J											827	D	J	
PCB-20/21/33														1670	D	J	
PCB-22														1710	D	J	
PCB-24/27														467	D	J	
PCB-25	41.4	D	J											919	D	J	
PCB-26														1080	D	J	
PCB-28														5920	D	J	
PCB-31														4580	D	J	
PCB-35	11.2	D					4.08	D, G			1540	D	J	267	D	J	**141**
PCB-37														1620	D	J	
PCB-40											7030	D	J	1080	D	J	**147**
PCB-41/64/71/72	149	B, D	J								31700	B, D	J	5330	D	J	**142**
PCB-42/59	62.3	D	J								11100	D	J	1990	D	J	**139**
PCB-43/49	163	D	J								34100	B, D	J	5450	D	J	**145**
PCB-44	179	B, D	J								34400	B, D	J	5720	D	J	**143**
PCB-45											5830	D	J	767	D	J	**153**
PCB-46	20.1	D									3550	D		523	D	J	**149**
PCB-47											14400	D	J	2690	D	J	**137**
PCB-48/75											6340	D	J	685	D	J	**161**
PCB-50	14.1	D		4.91	D, G		8.70	D, G		**55.7**	1300	D					
PCB-51											2900	D		560	D	J	**135**
PCB-52/69	228	B, D	J								45200	B, D	J	6570	D	J	**149**
PCB-53	43.9	D	J								6630	D	J	1170	D	J	**140**
PCB-55														130	D, G	J	
PCB-56/60											27600	D	J	4400	D	J	**145**
PCB-61/70	200	D	J								45500	B, D	J	6590	D	J	**149**
PCB-63	7.98	D, G									1950	D		330	D	J	**142**
PCB-67	3.76	D, G												153	D, G	J	
PCB-74	61.0	D	J								16800	B, D	J	2340	D	J	**151**
PCB-76/66	150	D	J								35700	D	J	6080	D	J	**142**
PCB-77											4370	D	J	856	D	J	**134**
PCB-79	3.01	D, G												146	D, G	J	
PCB-81							3.05	D, G									
PCB-82	45.6	D	J	11.5	D		18.4	D	J	**46.2**	8130	D	J	1550	D	J	**136**
PCB-83																	

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-84/92	129	B, D	J								23700	D	J	4010	D	J	**142**
PCB-85/116	47.1	D	J	14.1	D		21.9	D	J	**43.3**	9720	D	J	1980	D	J	**132**
PCB-87/117/125	121	D	J				50.6	D	J		19800	D	J	3780	D	J	**136**
PCB-88/91	40.3	D	J	13.0	D		21.9	D	J	**51.0**	8370	D	J	1380	D	J	**143**
PCB-89							1.14	D, G	J								
PCB-90/101	288	B, D	J	77.8	D						49600	B, D	J	8740	D	J	**140**
PCB-95/98/102	221	B, D	J								37800	B, D	J	6140	D	J	**144**
PCB-96																	
PCB-97	90.7	D	J								15900	D	J	3050	D	J	**136**
PCB-99	116	B, D	J				52.6	D	J		21700	D	J	4060	D	J	**137**
PCB-105	113	D	J				44.6	D			18300	D	J	4080	D	J	**127**
PCB-106/118	266	B, D	J				123	B, D	J		46900	B, D	J	9370	D	J	**133**
PCB-107/109	19.6	D					8.47	D, G	J		3600	D		748	D	J	**131**
PCB-108/112	15.1	D					7.53	D, G	J		2910	D		494	D	J	**142**
PCB-110	343	B, D	J				149	B, D	J		59600	B, D	J	11400	D	J	**136**
PCB-111/115	5.52	D, G									1490	D		202	D, G	J	**152**
PCB-114	5.85	D, G									1400	D		208	D, G	J	**148**
PCB-119	5.70	D, G												178	D, G	J	
PCB-124	13.2	D					5.52	D, G	J		2360	D		475	D	J	**133**
PCB-126														130	D, G	J	
PCB-128/162	62.5	D	J	13.6	D		21.9	D		**46.8**	9740	D	J	2110	D	J	**129**
PCB-129	23.0	D		4.18	D, G		7.82	D, G		**60.7**	3070	D		636	D	J	**131**
PCB-130	22.5	D	J	5.46	D, G		7.45	D, G		**30.8**	3500	D		757	D	J	**129**
PCB-132/161	97.6	D	J								14000	D	J	3090	D	J	**128**
PCB-133/142	10.1	D									1790	D		309	D	J	**141**
PCB-134/143	18.0	D		4.56	D, G		7.02	D, G		**42.5**	2820	D		611	D	J	**129**
PCB-135	50.1	D	J	12.7	D		19.1	D	J	**40.3**	9070	D	J	1350	D	J	**148**
PCB-136	41.7	D	J	12.2	D		21.6	D	J	**55.6**	7700	B, D	J	1180	D	J	**147**
PCB-137	18.0	D		4.37	D, G		8.13	D, G		**60.2**	3500	D		634	D	J	**139**
PCB-138/163/164	365	B, D	J				126	B, D			56500	B, D	J	11700	D	J	**131**
PCB-139/149	267	D	J	76.4	D		114	D	J	**39.5**	51100	B, D	J	8060	D	J	**146**
PCB-141	71.8	D	J								12400	D	J	2240	D	J	**139**
PCB-144	16.1	D									3280	D		477	D	J	**149**
PCB-146/165	40.9	D	J								6530	D	J	1240	D	J	**136**
PCB-147	7.99	D, G												216	D	J	
PCB-151	71.6	B, D	J	19.6	D						15500	B, D	J	2100	D	J	**152**
PCB-153	286	B, D	J				108	B, D			50400	B, D	J	9110	D	J	**139**
PCB-155	4.23	D, G															
PCB-156	39.1	D	J	6.64	D, G		12.8	D		**63.4**	6020	D	J	1250	D	J	**131**
PCB-157	9.10	D, G					3.71	D, G			1550	D		336	D	J	**129**
PCB-158/160	44.7	D	J								6810	D	J	1410	D	J	**131**
PCB-167	15.8	D		3.65	D, G		5.34	D, G		**37.6**	2430	D		527	D	J	**129**
PCB-170	99.9	D	J	20.6	D		31.1	D		**40.6**	17600	D	J	2900	D	J	**143**
PCB-171	26.0	D	J	5.71	D, G		8.38	D, G		**37.9**	4560	D	J	826	D	J	**139**
PCB-172	17.1	D	J	3.69	D, G		6.64	D, G		**57.1**	3370	D		589	D	J	**140**

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-174	104	D	J	21.9	D		31.6	D		**36.3**	18500	D	J	3010	D	J	**144**
PCB-175											1070	D, G		104	D, G	J	**165**
PCB-176	13.1	D		3.19	D, G		5.02	D, G		**44.6**	2560	D		354	D	J	**151**
PCB-177	60.8	D	J	11.2	D		19.1	D		**52.1**	10200	D	J	1700	D	J	**143**
PCB-178				5.43	D, G		9.00	D, G		**49.5**	5090	D	J	719	D	J	**150**
PCB-179	47.0	D	J								9850	D	J	1320	D	J	**153**
PCB-180	222	B, D	J								42700	D	J	6910	D	J	**144**
PCB-182/187	133	D	J	29.8	D		47.8	D		**46.4**	30800	D	J	4150	D	J	**153**
PCB-183	60.7	D	J	13.4	D		20.1	D		**40.0**	12400	D	J	1890	D	J	**147**
PCB-184				3.24	D, G		6.67	D, G		**69.2**	805	D, G					
PCB-185	13.0	D		3.28	D, G		5.04	D, G		**42.3**	2500	D		361	D	J	**150**
PCB-189											717	D, G					
PCB-190	19.1	D	J	4.22	D, G		6.10	D, G		**36.4**	3410	D		585	D	J	**141**
PCB-191											851	D, G		129	D, G	J	**147**
PCB-193	8.85	D, G		2.26	D, G		3.49	D, G		**42.8**	1960	D		309	D	J	**146**
PCB-194	49.2	D	J	8.82	D, G		14.7	D		**50.0**	11200	D	J	1710	D		**147**
PCB-195	21.8	D	J	3.90	D, G						4570	D	J	667	D		**149**
PCB-196/203	54.5	D	J	13.0	D		23.0	D		**55.6**	18400	D	J	1900	D	J	**163**
PCB-199	53.0	D	J	12.2	D		19.4	D		**45.6**	18800	D	J	1870	D	J	**164**
PCB-200	7.49	D, G									2680	D		263	D	J	**164**
PCB-201	8.62	D, G					3.30	D, G			2300	D		244	D	J	**162**
PCB-202	15.0	D	J	3.78	D, G		5.38	D, G		**34.9**	3900	D	J	414	D	J	**162**
PCB-206	35.6	D	J								8100	D	J	1430	D		**140**
PCB-207	3.87	D, G	J								941	D, G					
PCB-208	11.5	D	J				3.26	D, G			2590	D		498	D		**135**
PCB-209														1130	D		

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives

[c] COPCs/COPECs listed in the FFS: PCB -77, PCB -81, PCB -105, PCB -114, PCB -118, PCB -123, PCB -126, PCB -156, PCB -157, PCB -167, PCB -169, and PCB -189

[d] At least 2

[e] Fewer than 17

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
pg/g = picograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 ATTEMPT 3 FIELD DUPLICATE - PCB CONGENERS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

PCB Congener Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 17 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by asingle "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	NA	Yes	Yes	6	Yes	NA
LSM dissolved plus LSM particulate	Yes	NA	Yes	Yes	5	Yes	NA
HSM dissolved plus HSM partiulate	Yes	NA	Yes	Yes	9	No	NA
LSM dissolved	Yes	NA	Yes	Yes	3	Yes	NA
HSM dissolved	Yes	NA	Yes	Yes	5		NA
LSM particulate	Yes	NA	Yes	Yes	5	Yes	NA
HSM particulate	Yes	NA	Yes	Yes	9		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-1														161	D, G		
PCB-4/10	170	D	J	129	D						2600	D	J	1420	D		**58.7**
PCB-5/8														1970	D		
PCB-6														806	D		
PCB-7/9							7.65	D, G									
PCB-11														4130	D		
PCB-15														819	D		
PCB-16/32	259	D	J											3680	D		
PCB-17	226	D	J											3360	D		
PCB-18														3560	D		
PCB-19	85.9	D	J											933	D		
PCB-20/21/33														1170	D		
PCB-22														1100	D		
PCB-24/27	41.6	D												605	D		
PCB-25	66.6	D	J											1060	D		
PCB-26	70.9	D	J											950	D		
PCB-28	344	D	J											4500	D		
PCB-31														3710	D		
PCB-35	17.0	D					3.96	D, G	J					211	D		
PCB-37														1070	D		
PCB-40	48.1	D												771	D		
PCB-41/64/71/72	238	B, D	J											3960	D		
PCB-42/59	95.9	D	J											1470	D		
PCB-43/49	279	D	J											4130	D		
PCB-44	279	B, D	J											4390	D		
PCB-45	42.7	D												534	D		
PCB-46	26.6	D												416	D		
PCB-47	137	D	J											2140	D		
PCB-48/75	46.1	D												523	D		
PCB-50	15.3	D		4.71	D, G		8.12	D, G	J	**53.2**	655	D, G					
PCB-51	32.1	D												436	D		
PCB-52/69	362	B, D	J											5220	D		
PCB-53	67.8	D	J											819	D		
PCB-56/60	189	B, D	J											2830	D		
PCB-61/70	345	D	J											5030	D		
PCB-63	15.3	D					3.23	D, G	J		614	D, G		202	D, G		**101**
PCB-67	9.10	D, G												101	D, G		
PCB-74	109	D	J											1720	D		
PCB-76/66	259	D	J											4020	D		
PCB-77	35.5	D												563	D		
PCB-79											396	D, G					
PCB-82	79.9	D	J	10.7	D		18.5	D	J	**53.4**	3340	D	J	1210	D		**93.6**

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-84/92	230	B, D	J								8300	D	J	3420	D		**83.3**
PCB-85/116	93.0	D	J	13.0	D		22.9	D	J	**55.2**	3830	D	J	1410	D		**92.4**
PCB-87/117/125	215	D	J								8330	D	J	3150	D		**90.2**
PCB-88/91	77.8	D	J	12.5	D		19.7	D	J	**44.7**	3320	D	J	1190	D		**94.5**
PCB-90/101	525	B, D	J				129	B, D	J		20400	B, D	J	7520	D		**92.3**
PCB-95/98/102	390	B, D	J								15200	B, D	J	5440	D		**94.6**
PCB-97	163	D	J								6290	D	J	2440	D		**88.2**
PCB-99	214	B, D	J				55.7	D	J		8040	D	J	3330	D		**82.8**
PCB-105	209	D	J				43.9	D	J		7670	D	J	3100	D		**84.9**
PCB-106/118	503	B, D	J				105	B, D	J		19500	B, D	J	7530	D		**88.6**
PCB-107/109	30.3	D		4.78	D, G		7.48	D, G	J	**44.0**	1570	D		564	D		**94.3**
PCB-108/112	30.2	D					7.35	D, G	J		1090	D, G		406	D		**91.4**
PCB-110	594	B, D	J				146	B, D	J		25500	B, D	J	8940	D		**96.2**
PCB-111/115											669	D, G		165	D, G		**121**
PCB-114	11.7	D	J											187	D, G		
PCB-119	10.2	D, G									431	D, G		177	D, G		**83.6**
PCB-122														88.7	D, G		
PCB-123														185	D, G	J	
PCB-124	28.1	D					5.47	D, G	J		988	D, G		364	D		**92.3**
PCB-128/162	114	D	J	12.6	D		20.7	D	J	**48.6**	4220	D	J	1760	D		**82.3**
PCB-129	35.2	D	J				6.38	D, G	J		1500	D		475	D		**104**
PCB-130	47.4	D	J	4.36	D, G		7.63	D, G	J	**54.5**	1620	D		584	D		**94.0**
PCB-132/161	178	D	J								6780	D	J	2750	D		**84.6**
PCB-133/142	16.0	D	J				3.46	D, G	J		740	D, G		261	D		**95.7**
PCB-134/143	33.4	D	J	3.85	D, G		7.17	D, G	J	**60.3**	1270	D		481	D		**90.1**
PCB-135	75.7	D	J	13.3	D		20.7	D	J	**43.5**	4160	D	J	1310	D		**104**
PCB-136	75.7	D	J	9.13	D, G		17.6	D	J	**63.4**	3630	B, D	J	1070	D		**109**
PCB-137	32.1	D	J	3.76	D, G		6.74	D, G	J	**56.8**	1350	D		406	D		**107.5**
PCB-138/163/164	674	B, D	J				114	B, D	J		25400	B, D	J	9580	D		**90.5**
PCB-139/149	467	D	J	67.6	D		118	D	J	**54.3**	24100	B, D	J	7260	D		**107**
PCB-141	151	D	J								4990	D	J	1950	D		**87.6**
PCB-144	34.4	D					7.86	D, G	J		1530	D		402	D		**116.8**
PCB-146/165	77.3	D	J								2990	D	J	1100	D		**92.4**
PCB-147											910	D, G					
PCB-151	138	B, D	J	17.8	D		31.3	D	J	**55.0**	6320	B, D	J	1930	D		**106**
PCB-153	566	B, D	J				101	B, D	J		19900	B, D	J	7790	D		**87.5**
PCB-156	72.1	D	J	7.31	D, G		10.8	D	J	**38.5**	2580	D	J	1010	D		**87.5**
PCB-157	14.9	D	J	2.35	D, G		3.20	D, G	J	**30.6**	705	D, G		271	D		**88.9**
PCB-158/160	74.2	D	J								3110	D	J	1100	D		**95.5**
PCB-167	31.3	D	J	3.89	D, G		5.18	D, G	J	**28.4**	1010	D, G		442	D		**78.2**
PCB-169																	
PCB-170	231	D	J	15.6	D		29.4	D	J	**61.3**	7250	D	J	2900	D		**85.7**
PCB-171	61.8	D	J	4.47	D, G		7.89	D, G	J	**55.3**	1990	D	J	677	D		**98.5**
PCB-172	46.5	D	J	3.86	D, G		6.40	D, G	J	**49.5**	1420	D		558	D		**87.2**

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
PCB-174	245	D	J	18.4	D		32.0	D	J	**54.0**	6750	D	J	2740	D		**84.5**
PCB-175											359	D, G					
PCB-176	26.2	D	J	3.47	D, G		4.47	D, G	J	**25.2**	1020	D, G		308	D		**107**
PCB-177	136	D	J	10.6	D		18.6	D	J	**54.8**	4240	D	J	1670	D		**87.0**
PCB-178	53.6	D	J	6.16	D, G		8.47	D, G	J	**31.6**	1930	D	J	666	D		**97.4**
PCB-179	97.0	D	J											1250	D		
PCB-180	540	B, D	J								15600	D	J	6430	D		**83.3**
PCB-182/187	302	D	J	28.8	D		44.2	D	J	**42.2**	11100	D	J	3730	D		**99.4**
PCB-183	131	D	J	12.2	D		19.9	D	J	**48.0**	4570	D	J	1690	D		**92.0**
PCB-184				3.63	D, G		4.98	D, G	J	**31.4**	610	D, G					
PCB-185	32.3	D	J								968	D, G		320	D		**101**
PCB-189														120	D, G		
PCB-190	47.6	D	J	3.29	D, G		6.12	D, G	J	**60.1**	1430	D		492	D		**97.6**
PCB-191	8.67	D, G	J								320	D, G					
PCB-193	25.4	D	J				3.4	D, G	J		699	D, G		331	D		**71.5**
PCB-194	137	D	J	6.79	D, G		15.3	D		**77.0**	3390	D	J	1430	D		**81.3**
PCB-195	51.9	D	J	3.18	D, G		7.07	D, G		**75.9**	1230	D, G	J	610	D		**67.4**
PCB-196/203	153	D	J	13.2	D		18.3	D	J	**32.4**	4910	D	J	1800	D		**92.7**
PCB-197											327	D, G					
PCB-199	157	D	J	11.5	D		17.9	D	J	**43.5**	5080	D	J	1970	D		**88.2**
PCB-200	20.1	D	J											217	D		
PCB-201	22.0	D	J								685	D, G		234	D		**98.2**
PCB-202	36.3	D	J	3.15	D, G		6.06	D, G	J	**63.2**	1140	D, G	J	430	D		**90.4**
PCB-206	105	D	J											1210	D		
PCB-207	11.2	D	J								251	D, G		167	D, G	J	**40.2**
PCB-208	30.0	D	J								945	D, G		412	D		**78.6**
PCB-209														1080	D		

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives

[c] COPCs/COPECs listed in the FFS: PCB -77, PCB -81, PCB -105, PCB -114, PCB -118, PCB -123, PCB -126, PCB -156, PCB -157, PCB -167, PCB -169, and PCB -189

[d] At least 2

[e] Fewer than 17

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
pg/g = picograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

Appendix C

Detailed Evaluation Sheets
(Worksheet #11) – Aroclor PCBs

EVENT 1 ORIGINAL SAMPLE - AROCLOR PCBs

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Aroclor PCBs Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	Yes	NA	Yes	0	Yes	NA
LSM dissolved plus LSM particulate	Yes	Yes	NA	Yes	0	Yes	NA
HSM dissolved plus HSM particulate	Yes	Yes	NA	Yes	1	No	NA
LSM dissolved	Yes	Yes	NA	Yes	0	No	No
HSM dissolved	Yes	Yes	NA	Yes	0		No
LSM particulate	Yes	Yes	NA	Yes	0	Yes	NA
HSM particulate	No	Yes	NA	Yes	1		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Aroclor 1254														130	P	J	
Aroclor 1260														84	GP	J	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1260, Aroclor 1262, and Arolcor 1268.

[d] At least 1 more

[e] Fewer than 1

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
RPD = relative percent recovery
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = validation qualifier - See Attachment 2 for definitions

EVENT 1 FIELD DUPLICATE - AROCLOR PCBs

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Aroclor PCBs Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	Yes	NA	Yes	0	Yes	NA
LSM dissolved plus LSM particulate	Yes	Yes	NA	Yes	0	Yes	NA
HSM dissolved plus HSM particulate	Yes	Yes	NA	Yes	1	No	NA
LSM dissolved	Yes	Yes	NA	Yes	0	No	No
HSM dissolved	Yes	Yes	NA	Yes	0		No
LSM particulate	Yes	Yes	NA	Yes	0	Yes	NA
HSM particulate	No	Yes	NA	Yes	1		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Aroclor 1254														160		M	
Aroclor 1260														67	G	M	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1260, Aroclor 1262, and Arolcor 1268.

[d] At least 1 more

[e] Fewer than 1

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
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FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
RPD = relative percent recovery
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = validation qualifier - See Attachment 2 for definitions

EVENT 2 ORIGINAL SAMPLE - AROCLOR PCBs

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Aroclor PCBs Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	0	No	No
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	0	No	No
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	0	No	No
LSM dissolved	No	Yes	NA	Yes	0	No	No
HSM dissolved	No	Yes	NA	Yes	0		No
LSM particulate	No	Yes	NA	Yes	0	No	No
HSM particulate	No	Yes	NA	Yes	0		No

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Aroclor 1254														47	G	M	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1260, Aroclor 1262, and Arolcor 1268.

[d] At least 1 more

[e] Fewer than 1

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

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LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
RPD = relative percent recovery
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 2 FIELD DUPLICATE - AROCLOR PCBs

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Aroclor PCBs Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	0	Yes	NA
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	0	Yes	NA
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	1	No	NA
LSM dissolved	No	Yes	NA	Yes	0	No	No
HSM dissolved	No	Yes	NA	Yes	0		No
LSM particulate	No	Yes	NA	Yes	0	Yes	NA
HSM particulate	No	Yes	NA	Yes	1		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Aroclor 1254														45	G	M	
Aroclor 1260														22	GP	J	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1260, Aroclor 1262, and Arolcor 1268.

[d] At least 1 more

[e] Fewer than 1

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
PCB = polychlorinated biphenyl
RPD = relative percent recovery
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = laboratory qualifier - See Attachment 2 for definitions

Appendix D

Detailed Evaluation Sheets
(Worksheet #11) – Organochlorine Pesticide

EVENT 1 ORIGINAL SAMPLE - ORGANOCHLORINE PESTICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Organochlorine Pesticides Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 4 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	Yes	NA	Yes	3	No	No
LSM dissolved plus LSM particulate	Yes	Yes	NA	Yes	3	No	No
HSM dissolved plus HSM particulate	Yes	Yes	NA	No (4)[f]	NA	NA	NA
LSM dissolved	Yes	Yes	NA	Yes	3	No	Yes
HSM dissolved	Yes	Yes	NA	Yes	3		Yes
LSM particulate	Yes	Yes	NA	Yes	2	Yes	NA
HSM particulate	No	Yes	NA	No (4)[f]	NA	NA	NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[g]

Analyte Identified	Whole Water (pg/L)	LQ[h]	VQ	LSM Dissolved (pg/L)	LQ[h]	VQ	HSM Dissolved (pg/L)	LQ[h]	VQ	% RPD	LSM Particulate (pg/g)	LQ[h]	VQ	HSM Particulate (pg/g)	LQ[h]	VQ	% RPD
alpha-BHC				25.8													
Lindane (gamma-BHC)	313		J	262			291		J	**10.5**	455			294		J	**43.0**
beta-BHC	136		J	110			131		J	**17.4**				71.9	G	J	
Heptachlor	151			70.9	G		130		J	**58.8**	1300	DG	J	138	G	J	**162**
Aldrin	82.3		J	36.8		J	65		J	**55.4**	772		J				
Oxychlordane	46.9		J				44.9		J		646		J				
cis-Heptachlor Epoxide	371		J	210			320		J	**41.5**	2600		J	555		J	**130**
trans-Chlordane (gamma)	2020		J	865		J	1870		J	**73.5**	202000		J	3930		J	**192**
trans-Nonachlor	1190		J	422		J	774		J	**58.9**	8890		J	2780		J	**105**
cis-Chlordane (alpha)	2270	D	J	1120		J	1870		J	**50.2**	17800		J	5320		J	**108**
Endosulfan I (alpha)	112	G	J	70.3	G	J	82.5	G	J	**16.0**							
4,4'-DDE														7840		J	
Dieldrin	2450	BD	J	1160	B	J	2390	BD	J	**69.3**				3680		J	
Endrin							28.6	G	J								
cis-Nonachlor	257		J	117		J	252		J	**73.2**	1820		J	538		J	**109**
Endosulfan II (beta)							85.4	G	J								
4,4'-DDD														29200	E	J	
Endosulfan Sulfate							101	G	J								
4,4'-Methoxychlor	480		J	239		J	380		J	**45.6**	3980	DG					
Mirex							16.5		J								
Endrin Ketone	97.1	G	J	85	B	J	64.6	G	J	**27.3**							

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: cis-Chlordane(alpha), trans-Chlordane(gamma), Dieldrin, 4,4'-DDE, 4,4'-DDD, and 4,4'DDT.

[d] At least 1 more

[e] Fewer than 4

[f] Values in parentheses indicate the total number of rejected results

[g] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[h] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:

COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
pg/g = picograms per gram
pg/L = picograms per liter
RPD = relative percent difference
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 FIELD DUPLICATE - ORGANOCHLORINE PESTICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Organochlorine Pesticides Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 4 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	Yes	NA	Yes	3	Yes	NA
LSM dissolved plus LSM particulate	Yes	Yes	NA	Yes	3	Yes	NA
HSM dissolved plus HSM particulate	Yes	Yes	NA	Yes (2)[f]	5	No	NA
LSM dissolved	Yes	Yes	NA	Yes	3	No	Yes
HSM dissolved	Yes	Yes	NA	Yes	3		Yes
LSM particulate	Yes	Yes	NA	Yes	3	Yes	NA
HSM particulate	No	Yes	NA	Yes (2)[f]	5		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[g]

Analyte Identified	Whole Water (pg/L)	LQ[h]	VQ	LSM Dissolved (pg/L)	LQ[h]	VQ	HSM Dissolved (pg/L)	LQ[h]	VQ	% RPD	LSM Particulate (pg/g)	LQ[h]	VQ	HSM Particulate (pg/g)	LQ[h]	VQ	% RPD
alpha-BHC	26.5		J														
Lindane (gamma-BHC)	311		J	286		J	290		J	**1.4**	617		J	319		J	**63.7**
beta-BHC	127		J	124		J	128		J	**3.2**	520		J	268		J	**64.0**
delta-BHC							6.46	G	J								
Heptachlor	143		J				129		J		1290		J	470	G	J	**93.2**
Aldrin	88.7		J	40.5		J	55.8		J	**31.8**							
Oxychlordane	60.6		J											476		J	
cis-Heptachlor Epoxide	376		J	211		J	335		J	**45.4**	2770		J	1690		J	**48.4**
trans-Chlordane (gamma)	1880		J	1020	D		1590		J	**43.7**	22100		J	10900		J	**67.9**
trans-Nonachlor	1070		J	605		J	935		J	**42.9**	10800		J	7350		J	**38.0**
cis-Chlordane (alpha)	2440	D	J	1120		J	1830	D		**48.1**	21800		J	15200	E	J	**35.7**
Endosulfan I (alpha)	121	G	J				117	G	J		1050	G	J				
4,4'-DDE														23000		J	
Dieldrin	2610	BD	J	1240	B	J	2290	BD	J	**59.5**	18000		J	9470		J	**62.1**
cis-Nonachlor	290		J								2480		J	2750		J	**10.3**
Endosulfan II (beta)							112	G	J								
4,4'-DDD														102000	E	J	
Endosulfan Sulfate							112	G	J								
4,4'-Methoxychlor	523		J	257	DG	J	375		J	**37.3**	3410		J				
Endrin Ketone							83.1		J								

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: cis-Chlordane(alpha), trans-Chlordane(gamma), Dieldrin, 4,4'-DDE, 4,4'-DDD, and 4,4'DDT.

[d] At least 1 more

[e] Fewer than 4

[f] Values in parentheses indicate the total number of rejected results

[g] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[h] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern LQ = laboratory qualifier - See Attachment 1 for definitions VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 2 ORIGINAL SAMPLE - ORGANOCHLORINE PESTICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Organochlorine Pesticides Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 4 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	3	Yes	NA
LSM dissolved plus LSM particulate	No	Yes	NA	Yes (1)[f]	3	Yes	NA
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	4	No	NA
LSM dissolved	No	Yes	NA	Yes	3	No	No
HSM dissolved	No	Yes	NA	Yes	3		No
LSM particulate	No	Yes	NA	Yes (1)[f]	3	Yes	NA
HSM particulate	No	Yes	NA	Yes	4		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[g]

Analyte Identified	Whole Water (pg/L)	LQ[h]	VQ	LSM Dissolved (pg/L)	LQ[h]	VQ	HSM Dissolved (pg/L)	LQ[h]	VQ	% RPD	LSM Particulate (pg/g)	LQ[h]	VQ	HSM Particulate (pg/g)	LQ[h]	VQ	% RPD
Hexachlorobenzene														2670	D	J	
alpha-BHC	70.1			66.9			60.3		J	**10.4**				102	D	J	
Lindane (gamma-BHC)	146			147			153		J	**4.0**				342	D	J	
beta-BHC	23													223	D	J	
Heptachlor	43.9	G					43.2	G	J					680	D	J	
Aldrin											1290	G					
Oxychlordane	33.4		J								2710			554	D	J	**132**
cis-Heptachlor Epoxide	128		J	65.0			112		J	**53.1**	6060			1590	D	J	**117**
trans-Chlordane (gamma)	674			210		J	513		J	**83.8**	62600			10000	D	M	**145**
trans-Nonachlor	439			123		J	311		J	**86.6**	39500		J	8080	D	J	**132**
cis-Chlordane (alpha)	661		J	218		J	591		J	**92.2**	67500		J	13500	D	J	**133**
Endosulfan I (alpha)	64.4	G					53.7	G	J		2960	G	J				
4,4'-DDE														21100	D	J	
Dieldrin	421			220			480		J	**74.3**	27300		J	5050	D	J	**138**
cis-Nonachlor	113			33.6			80.6		J	**82.3**	11800		J	2320	D	JH	**134**
Endosulfan II (beta)	633		J	64.9	G		93.5	G	J	**36.1**							
Endosulfan Sulfate				45.0	G												
4,4'-Methoxychlor	170	G	J	67.0	G		120		J	**56.7**	11500	G	J				
Mirex				2.29	G	J			J		1090	G	J				

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: cis-Chlordane(alpha), trans-Chlordane(gamma), Dieldrin, 4,4'-DDE, 4,4'-DDD, and 4,4'DDT.

[d] At least 1 more

[e] Fewer than 4

[f] Values in parentheses indicate the total number of rejected results

[g] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[h] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern LQ = laboratory qualifier - See Attachment 1 for definitions VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 2 FIELD DUPLICATE - ORGANOCHLORINE PESTICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Organochlorine Pesticides Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 4 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Is at least 1 more COPC/COPEC[c] identified in another sample type?	If no single sample type being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	3	No	No
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	3	No	No
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	3	No	No
LSM dissolved	No	Yes	NA	Yes	3	No	No
HSM dissolved	No	Yes	NA	Yes	3		No
LSM particulate	No	Yes	NA	Yes	3	No	No
HSM particulate	No	Yes	NA	Yes	3		No

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (pg/L)	LQ[g]	VQ	LSM Dissolved (pg/L)	LQ[g]	VQ	HSM Dissolved (pg/L)	LQ[g]	VQ	% RPD	LSM Particulate (pg/g)	LQ[g]	VQ	HSM Particulate (pg/g)	LQ[g]	VQ	% RPD
alpha-BHC	72.7			63.5			63.2			**0.47**				82.7	DG	M	
Lindane (gamma-BHC)	147			134			150			**11.3**				203	DG	J	
beta-BHC	30.6													231	DG	M	
Heptachlor							41.2	G			2890	G					
Aldrin											997	G		264	DG	J	**116**
Oxychlordane	44.6		J								2110			460	DG	M	**128**
cis-Heptachlor Epoxide	137		J	56.2			119			**71.7**	4870			1530	D	M	**104**
trans-Chlordane (gamma)	648			204		J	540			**90.3**	49800			9350	D	M	**137**
trans-Nonachlor	421		J	120		J	320		J	**90.9**	27400		J	7790	D	M	**111**
cis-Chlordane (alpha)	665		J	200		J	622		J	**103**	55600		J	13600	D	M	**121**
Endosulfan I (alpha)				41.6	G	J	52.2	G	J	**22.6**	1850	G	J	502	DG	J	**115**
Dieldrin	449		J	214			456		J	**72.2**	18200		J	5550	D	J	**107**
cis-Nonachlor	115		J	33.7			81.8		J	**83.3**	7820		J	2740	D	J	**96.2**
Endosulfan II (beta)	711		J				80.6	G	J								
Endosulfan Sulfate	117	G	J	47.9	G												
4,4'-Methoxychlor	174		J	62.7	G		107	G	J	**52.2**	6960	G	J				
Mirex	13.8	G	J														
Endrin Keton				10.9	G												

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: cis-Chlordane(alpha), trans-Chlordane(gamma), Dieldrin, 4,4'-DDE, 4,4'-DDD, and 4,4'DDT.

[d] At least 1 more

[e] Fewer than 4

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full Target Analyte List. Additional pages may be necessary.

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern LQ = laboratory qualifier - See Attachment 1 for definitions VQ = laboratory qualifier - See Attachment 2 for definitions

Appendix E

Detailed Evaluation Sheets
(Worksheet #11) – SVOCs

EVENT 1 ORIGINAL SAMPLE - SEMIVOLATILES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 6 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least five more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	NA	Yes	4	NA
LSM dissolved plus LSM particulate	Yes	Yes	NA	No (9)[c]	NA	NA
HSM dissolved plus HSM particulate	Yes	Yes	NA	No (8)[c]	NA	NA
LSM dissolved	Yes	Yes	NA	Yes (1)[c]	3	NA
HSM dissolved	Yes	Yes	NA	No (8)[c]	NA	NA
LSM particulate	Yes	Yes	NA	No (9)[c]	NA	NA
HSM particulate	No	Yes	NA	Yes (1)[c]	2	NA

Positive Target Analyte Identification and Concentration Comparison[d]

Analyte Identified	Whole Water (µg/L)	LQ[e]	VQ	LSM Dissolved (µg/L)	LQ[e]	VQ	HSM Dissolved (µg/L)	LQ[e]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[e]	VQ	HSM Particulate (µg/kg)	LQ[e]	VQ	% RPD
Phenol				2.4			1.7		J	**34.1**							
4-Methylphenol	0.80	GD		9.3		J	5.4		J	**53.1**				5100	GD	M	
Diethylphthalate	3.1	D															
Di-n-butylphthalate	2.2	DB		0.70	GB		2.7		J	**118**	4100	GD	J	13000	DB	M	**104**
Butylbenzylphthalate							2.8	B	J								
Bis(2-ethylhexyl)phthalate	5.3	DB					29	EB	J								

There are no COPC/COPECs in the target list for SVOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives

[c] Values in paretheses indicate the total number of rejected results.

[d] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[e] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 FIELD DUPLICATE - SEMIVOLATILES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 6 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least five more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	NA	Yes	4	No
LSM dissolved plus LSM particulate	Yes	Yes	NA	Yes (1)[c]	4	No
HSM dissolved plus HSM particulate	Yes	Yes	NA	No (8)[c]	NA	NA
LSM dissolved	Yes	Yes	NA	Yes	4	NA
HSM dissolved	Yes	Yes	NA	No (8)[c]	NA	NA
LSM particulate	Yes	Yes	NA	Yes (1)[c]	2	No
HSM particulate	No	Yes	NA	Yes (1)[c]	4	No

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water (µg/L)	LQ[e]	VQ	LSM Dissolved (µg/L)	LQ[e]	VQ	HSM Dissolved (µg/L)	LQ[e]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[e]	VQ	HSM Particulate (µg/kg)	LQ[e]	VQ	% RPD
Phenol	2.1	GD					2.0	GD									
Acetophenone				0.30	G												
4-Methylphenol							8.6	D	J					4000		M	
Diethylphthalate	3.7	D		3.7		J	3.4	D	J	**8.45**	2200	G					
Di-n-butylphthalate	3.0	GDB		1.1	B		2.1	GD	J	**62.5**	5900	G		4200	B	M	**33.7**
Butylbenzylphthalate				1.7	B									37000	EB	J	
Bis(2-ethylhexyl)phthalate	8.3	DB												25000	EB	J	

There are no COPC/COPECs in the target list for SVOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Values in paretheses indicate the total number of rejected results.

[d] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[e] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 ORIGINAL SAMPLE - SEMIVOLATILES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 6 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least five more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	No	Yes	NA	Yes	4	No
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	5	No
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	10	Yes
LSM dissolved	No	Yes	NA	Yes	4	No
HSM dissolved	No	Yes	NA	Yes	5	No
LSM particulate	No	Yes	NA	Yes	1	No
HSM particulate	No	Yes	NA	Yes	8	Yes

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
Phenol				0.27	G	J	0.29	G		**7.14**							
Acetophenone	0.17	G		0.16	G		0.17	G		**6.06**							
4-Methylphenol														120	G	J	
Dibenzofuran														48	G	M	
Diethylphthalate	1.3			1.3			1.3			**0.00**				35	G	M	
Carbazole														300	G	M	
Di-n-butylphthalate	0.22	G		0.24	G		0.28	G		**15.4**				320	G	M	
Butylbenzylphthalate														1200		M	
Bis(2-ethylhexyl)phthalate	2.5						2.1				240000			12000	D	J	**181**
Di-n-octylphthalate														2000		J	

There are no COPC/COPECs in the target list for SVOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary.

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 FIELD DUPLICATE - SEMIVOLATILES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 6 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least five more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	No	Yes	NA	Yes	4	No
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	5	No
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	8	No
LSM dissolved	No	Yes	NA	Yes	4	No
HSM dissolved	No	Yes	NA	Yes	4	No
LSM particulate	No	Yes	NA	Yes	1	No
HSM particulate	No	Yes	NA	Yes	6	Yes

Positive Target Analyte Identification and Concentration Comparison [c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
Phenol	0.18	G	J	0.32	G		0.28	G		**13.3**							
Acetophenone				0.14	G												
4-Methylphenol														66	G	J	
Dibenzofuran														42	G	M	
Diethylphthalate	1.6			1.1			1.1			**0.00**							
Carbazole														130	G	M	
Di-n-butylphthalate	0.32	G		0.20	G		0.28	G		**33.3**				250	G	M	
Butylbenzylphthalate														1400		M	
Bis(2-ethylhexyl)phthalate	3.0						2.3				180000			11000	D	J	**177**

There are no COPC/COPECs in the target list for SVOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

Appendix F

Detailed Evaluation Sheets
(Worksheet #11) – SVOC SIM

EVENT 1 ORIGINAL SAMPLE- SEMIVOLATILES-SIM

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC SIM Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 3 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	If no single sample types being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	Yes	NA	Yes	12	Yes	NA
LSM dissolved plus LSM particulate	Yes	Yes	NA	Yes	10	Yes	NA
HSM dissolved plus HSM particulate	Yes	Yes	NA	Yes	16	No	NA
LSM dissolved	Yes	Yes	NA	Yes	4	Yes	NA
HSM dissolved	Yes	Yes	NA	Yes	7		NA
LSM particulate	Yes	Yes	NA	Yes	6	Yes	NA
HSM particulate	No	Yes	NA	Yes	14		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Naphthalene	0.26	DB	J	0.34	DB		0.24	DB	J	**34.5**							
2-Methylnaphthalene	0.32	DB	J	0.41	DB		0.34	DB	J	**18.7**				110	DB	J	
Acenaphthene	0.023	D	J	0.022	D		0.019	D	J	**14.6**							
Fluorene	0.031	DB	J	0.021	D		0.025	DB	J	**17.4**				75	D	J	
Phenanthrene	0.11	DB	J				0.076	DB	J					710	DB	J	
Anthracene	0.022	DB	J											120	D	J	
Fluoranthene	0.15	DB	J				0.054	DB	J		870	DB	J	1900	DB	J	**74.4**
Pyrene	0.15	DB	J				0.083	DB	J		930	DB	J	1000	DB	J	**7.25**
Benzo(a)anthracene														780	D	J	
Chrysene														920	D	J	
Benzo(b)fluoranthene	0.050	DB	J								630	D		890	D	J	**34.2**
Benzo(k)fluoranthene	0.049	DB	J								500	D		730	D	J	**37.4**
Benzo(a)pyrene	0.038	DB	J								450	D		750	D	J	**50.0**
Indeno(1,2,3-cd)pyrene														400	D	J	
Dibenzo(a,h)anthracene														120	D	J	
Benzo(g,h,i)perylene	0.022	DB	J								310	D		410	D	J	**27.8**
1-Methylnaphthalene	0.22	DB	J	0.28	D		0.23	DB	J	**19.6**				68	D	J	
Benzo[e]pyrene	0.036	DB	J								420	D		640	D	J	**41.5**
Perylene														200	D	J	
3,6-Dimethylphenanthrene														54	D	J	
1-Methylanthracene	0.049	DB	J	0.031	D	J	0.050	DB	J	**46.9**	620	D	J	260	D	J	**81.8**
1-Methylfluoranthene											310	D		180	D	J	**53.1**
1-Methylpyrene														87	D	J	
2,6-Dimethylnaphthalene	0.16	DB	J	0.10	D		0.14	DB	J	**33.3**	480	D		150	D	J	**104.8**
2,3,5-Trimethylnaphthalene	0.092	DB	J	0.054	D		0.070	DB	J	**25.8**	580	GD		120	D	J	**131.4**
1,1'-Biphenyl	0.022	DB	J				0.019	DB	J								
1-Methylphenanthrene	0.084	DB	J	0.037	D		0.069	DB	J	**60.4**				190		J	
Dibenzothiophene	0.029	DB	J				0.026	DB	J					51		J	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Naphthalene, Fluorene, Pyrene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, 2-methylnaphthalene, Phenanthrene, Benzo(a)anthracene, Benzo(a)pyrene, Acenaphthylene, Anthracene, Chrysene, Indeno(1,2,3-cd)pyrene, Acenaphthene, Fluoranthene, Benzo(b)fluoranthene, and Dibenzo(a,h)anthracene.

[d] At least 2 more

[e] Fewer than 3

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary.

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SIM = selective ion monitoring
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 FIELD DUPLICATE - SEMIVOLATILES-SIM

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC SIM Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 3 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	types being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	Yes	Yes	NA	Yes	9	Yes	NA
LSM dissolved plus LSM particulate	Yes	Yes	NA	Yes	11	Yes	NA
HSM dissolved plus HSM particulate	Yes	Yes	NA	Yes	14	No	NA
LSM dissolved	Yes	Yes	NA	Yes	4	No	Yes
HSM dissolved	Yes	Yes	NA	Yes	5		Yes
LSM particulate	Yes	Yes	NA	Yes	7	Yes	NA
HSM particulate	No	Yes	NA	Yes	12		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Naphthalene	0.30	BD	J	0.37	DB		0.23	DB	J	**46.7**							
2-Methylnaphthalene	0.40	BD	J	0.44	D		0.31	DB	J	**34.7**				71	DB	J	
Acenaphthene				0.020	D												
Fluorene	0.028	BD	J	0.022	D		0.020	DB	J								
Phenanthrene	0.097	BD	J				0.063	DB	J					300	DB	J	
Fluoranthene	0.12	BD	J								1600	DB	J	770	DB	J	**70.0**
Pyrene	0.14	BD	J				0.069	DB	J		1000	DB	J	680	DB	J	**38.1**
Benzo(a)anthracene														310	D	J	
Chrysene														410	D	J	
Benzo(b)fluoranthene	0.042	BD	J								880	D		390	D	J	**77.2**
Benzo(k)fluoranthene	0.043	BD	J								720	D		290	D	J	**85.1**
Benzo(a)pyrene	0.033	BD	J								540	D		280	D	J	**63.4**
Indeno(1,2,3-cd)pyrene											300	D		180	D	J	**50.0**
Dibenzo(a,h)anthracene														66	D	J	
Benzo(g,h,i)perylene											340	D		220	D	J	**42.9**
1-Methylnaphthalene	0.26	BD	J	0.31	D		0.21	DB	J	**38.5**							
Benzo[e]pyrene	0.029	BD	J								550	D		270	D	J	**68.3**
Perylene														77	D	J	
3,6-Dimethylphenanthrene											330	D					
1-Methylanthracene	0.040	BD	J	0.030	D	J	0.043	DB	J	**35.6**	630	D	J	91	D	J	**150**
1-Methylfluoranthene											320	D		110	D	J	**97.7**
2,6-Dimethylnaphthalene	0.15	BD	J	0.10	D		0.12	DB	J	**18.2**	450	D		100	D	J	**127**
2,3,5-Trimethylnaphthalene	0.083	BD	J	0.054	D		0.074	DB	J	**31.3**	700	D		76	D	J	**161**
1-Methylphenanthrene	0.082	BD	J	0.037	D		0.061	DB	J	**49.0**							
Dibenzothiophene	0.028	BD	J				0.025	DB	J								

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Naphthalene, Fluorene, Pyrene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, 2-methylnaphthalene, Phenanthrene, Benzo(a)anthracene, Benzo(a)pyrene, Acenaphthylene, Anthracene, Chrysene, Indeno(1,2,3-cd)pyrene, Acenaphthene, Fluoranthene, Benzo(b)fluoranthene, and Dibenzo(a,h)anthracene

[d] At least 2 more

[e] Fewer than 3

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SIM = selective ion monitoring
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 ORIGINAL SAMPLE - SEMIVOLATILES-SIM

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC SIM Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 3 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	types being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	15	Yes	NA
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	16	No	No
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	17	No	No
LSM dissolved	No	Yes	NA	Yes	16	Yes	NA
HSM dissolved	No	Yes	NA	Yes	14		NA
LSM particulate	No	Yes	NA	Yes	13	Yes	NA
HSM particulate	No	Yes	NA	Yes	16		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison[f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Naphthalene				0.051	B	J	0.035	BD	J	**37.2**				90	BD	J	
2-Methylnaphthalene	0.044	D	J				0.052	D						76	D	M	
Acenaphthylene	0.0055	GD	J	0.0058		J	0.0025	GD		**79.5**	480	G	J				
Acenaphthene	0.013	D	J	0.014			0.015	D		**6.90**				52	D	M	
Fluorene	0.026	D	J	0.021			0.030	D		**35.3**				80	D	M	
Phenanthrene	0.065	D	J	0.038	B		0.064	D		**51.0**	2500	B	J	790	BD	M	**104**
Anthracene	0.013	D	J	0.015			0.011	D		**30.8**	870		J	100	D	M	**159**
Fluoranthene	0.082	D	J	0.039	B	J	0.069	D		**55.6**	9100		J	1000	D	M	**160**
Pyrene	0.066	D	J	0.026	B	JL	0.056	D		**73.2**	8400		J	940	D	M	**160**
Benzo(a)anthracene	0.032	D	J	0.0074		JL	0.023	D		**103**	6700		J	580	D	M	**168**
Chrysene	0.050	D	J	0.014		JL	0.034	D		**83.3**	8600		J	940	D	M	**161**
Benzo(b)fluoranthene	0.047	D	J	0.0081		JL	0.033	D		**121**	7200		J	830	D	M	**159**
Benzo(k)fluoranthene	0.039	D	J	0.0061		JL	0.029	D		**130**	8500		J	750	D	M	**168**
Benzo(a)pyrene	0.030	D	J	0.0040	G	JL	0.020	D		**133**	6600		J	560	D	M	**169**
Indeno(1,2,3-cd)pyrene	0.012	D	J	0.0021	G	JL					5100		J	540	D	M	**162**
Dibenzo(a,h)anthracene				0.00075	G	JL					1800		J	200	D	M	**160**
Benzo(g,h,i)perylene	0.012	D	J	0.0028	G	JL					6200		J	650	D	M	**162**
1-Methylnaphthalene	0.041	D	J	0.063		J	0.053	D		**17.2**				54	D	M	
Benzo[e]pyrene	0.031	D	J	0.0059		JL	0.021	D		**112**	7300		J	650	D	M	**167**
Perylene	0.0089	D	J	0.00082	G	JL	0.0054	GD		**147**	2000		J	170	D	M	**169**
3,6-Dimethylphenanthrene	0.0085	GD	J	0.0035	GB	JL	0.011	D		**103**	500		J	53	D	M	**162**
1-Methylanthracene	0.016	D	J	0.0087			0.022	D		**86.6**	1700		J	110	D	M	**176**
1-Methylfluoranthene	0.019	D	J	0.0072			0.016	D		**75.9**	2700		J	260	D	M	**165**
1-Methylpyrene	0.0063	GD	J	0.0024	G		0.0068	GD		**95.7**	840		J	74	D	M	**168**
2,6-Dimethylnaphthalene	0.069	D	J	0.053		J	0.092	D		**53.8**				70	D	M	
2,3,5-Trimethylnaphthalene	0.044	D	J	0.036		J	0.052	D	J	**36.4**	350	G	J	53	D	M	**147**
Dibenzofuran				0.0073			0.016	D		**74.7**				48	D	M	
1-Methylphenanthrene	0.025	D	J	0.0069			0.036	D		**136**	400	G	J	94	D	M	**124**
Dibenzothiophene	0.011	D	J	0.011			0.018	D		**48.3**				52	D	M	

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Naphthalene, Fluorene, Pyrene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, 2-methylnaphthalene, Phenanthrene, Benzo(a)anthracene, Benzo(a)pyrene, Acenaphthylene, Anthracene, Chrysene, Indeno(1,2,3-cd)pyrene, Acenaphthene, Fluoranthene, Benzo(b)fluoranthene, and Dibenzo(a,h)anthracene.

[d] At least 2 more

[e] Fewer than 3

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary.

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SIM = selective ion monitoring
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 FIELD DUPLICATE - SEMIVOLATILES-SIM

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

SVOC SIM Sample Collection Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes		
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 3 results "R" qualified (rejected due to association with severe data quality issues)?	Number of COPCs/COPECs[c] listed in the FFS identified?	Are at least 2 more COPCs/COPECs[c] identified in another sample type?	If no single sample types being compared was significantly[d] different in the number of COPCs/COPECs[c] identified (distinguished by a single "no" in the previous column), are the overall number of target analytes identified significantly[e] different?
	Attempt 1	Attempt 2	Attempt 3				
Whole Water	No	Yes	NA	Yes	17	No	No
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	16	No	No
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	17	No	No
LSM dissolved	No	Yes	NA	Yes	15	Yes	NA
HSM dissolved	No	Yes	NA	Yes	13		NA
LSM particulate	No	Yes	NA	Yes	14	Yes	NA
HSM particulate	No	Yes	NA	Yes	16		NA

See footnotes on the last page

Positive Target Analyte Identification and Concentration Comparison [f]

Analyte Identified	Whole Water (µg/L)	LQ[g]	VQ	LSM Dissolved (µg/L)	LQ[g]	VQ	HSM Dissolved (µg/L)	LQ[g]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[g]	VQ	HSM Particulate (µg/kg)	LQ[g]	VQ	% RPD
Naphthalene	0.23	DB	J	0.037	B	JL								410	BD	J	
2-Methylnaphthalene	0.25	D	J				0.049	D						73	D	M	
Acenaphthylene	0.057	GD	J	0.018		JL	0.003	GD		**143**	2500	GD	J				
Acenaphthene	0.12	D	J	0.0072		JL	0.013	D		**57.4**				40	D	M	
Fluorene	0.18	D	J	0.014		JL	0.028	D		**66.7**	6900	D	J	66	D	M	**196**
Phenanthrene	1.5	D	J	0.044	B	JL	0.060	D		**30.8**	65000	DB	J	590	BD	M	**196**
Anthracene	0.29	D	J	0.012		JL	0.0089	D		**29.7**	10000	D	J	82	D	M	**197**
Fluoranthene	2.9	D	J	0.031	B	J	0.060	D		**63.7**	130000	D	J	1100	D	M	**197**
Pyrene	1.8	D	J	0.019	B		0.058	D		**101**	91000	D	J	810	D	M	**196**
Benzo(a)anthracene	1.2	D	J	0.0033	G		0.020	D		**143**	54000	D	J	470	D	M	**197**
Chrysene	1.7	D	J	0.0083			0.032	D		**118**	83000	D	J	770	D	M	**196**
Benzo(b)fluoranthene	1.8	D	J	0.0035	G		0.032	D		**161**	82000	D	J	720	D	M	**197**
Benzo(k)fluoranthene	1.3	D	J	0.0022	G		0.026	D		**169**	64000	D	J	630	D	M	**196**
Benzo(a)pyrene	1.3	D	J	0.0018	G		0.018	D		**164**	56000	D	J	470	D	M	**197**
Indeno(1,2,3-cd)pyrene	1.1	D	J	0.0010	G						44000	D	J	420	D	M	**196**
Dibenzo(a,h)anthracene	0.38	D	J								16000	D	J	150	D	M	**196**
Benzo(g,h,i)perylene	1.3	D	J	0.0016	G						55000	D	J	540	D	M	**196**
1-Methylnaphthalene	0.17	D	J	0.034		JL	0.047	D		**32.1**				49	D	M	
Benzo[e]pyrene	1.3	D	J	0.0026	G		0.019	D		**152**	61000	D	J	570	D	M	**196**
Perylene	0.38	D	J	0.00051	G		0.0058	GD		**168**	15000	D	J	140	D	M	**196**
3,6-Dimethylphenanthrene	0.13	D	J	0.0028	GB	JL	0.0095	D		**109**	4300	GD	J	37	D	M	**197**
1-Methylanthracene	0.27	D	J	0.0049		JL	0.016	D		**106**	15000	D	J	80	D	M	**198**
1-Methylfluoranthene	0.46	D	J	0.0036	G		0.013	D		**113**	24000	D	J	210	D	M	**197**
1-Methylpyrene	0.13	D	J	0.0014	G		0.0061	GD		**125**	7100	D	J	64	D	M	**196**
2,6-Dimethylnaphthalene	0.21	D	J	0.027		JL	0.087	D		**105**	5400	D	J	77	D	M	**194**
2,3,5-Trimethylnaphthalene	0.18	D	J	0.014		JL	0.011	D	J	**24.0**	7500	GD	J	60	D	M	**197**
1,1'-Biphenyl				0.0049		JL											
Dibenzofuran	0.12	D	J	0.0046		JL	0.0094	D		**68.6**				37	D	M	**200**
1-Methylphenanthrene	0.14	D	J	0.0057		JL	0.032	D		**140**	10000	D	J	120	D	M	**195**
Dibenzothiophene	0.13	D	J	0.015		JL	0.016	D		**6.45**	3700	GD	J	32	GD	M	**197**

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] COPCs/COPECs listed in the FFS: Naphthalene, Fluorene, Pyrene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, 2-methylnaphthalene, Phenanthrene, Benzo(a)anthracene, Benzo(a)pyrene, Acenaphthylene, Anthracene, Chrysene, Indeno(1,2,3-cd)pyrene, Acenaphthene, Fluoranthene, Benzo(b)fluoranthene, and Dibenzo(a,h)anthracene.

[d] At least 2 more

[e] Fewer than 3

[f] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[g] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatively less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
FFS = focused fesability study
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
SIM = selective ion monitoring
SVOC = semivolatile organic compound
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = laboratory qualifier - See Attachment 2 for definitions
% = percent

Appendix G

Detailed Evaluation Sheets
(Worksheet #11) – Chlorinated
Herbicides

EVENT 1 ATTEMPT 2 ORIGINAL SAMPLE - CHLORINATED HERBICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Chlorinated Herbicides Sample Collection Technique	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	Yes	Yes	0	No
LSM dissolved plus LSM particulate	Yes	Yes	Yes	Yes	2	Yes
HSM dissolved plus HSM particulate	Yes	Yes	Yes	Yes	1	No
LSM dissolved	Yes	Yes	Yes	Yes	2	Yes
HSM dissolved	Yes	Yes	Yes	Yes	0	No
LSM particulate	Yes	Yes	Yes	Yes	0	No
HSM particulate	No	Yes	Yes	Yes	1	Yes

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
2,4-DB				0.45		NJ											
2,4,5-T														24	G	JL	
Silvex (2,4,5-TP)				0.02		J											

There are no COPCs/COPECs in the target analyte list for chlorinated herbicides.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] This target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 ATTEMPT 2 FIELD DUPLICATE - CHLORINATED HERBICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Chlorinated Herbicides Sample Collection Technique	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	Yes	Yes	0	No
LSM dissolved plus LSM particulate	Yes	Yes	Yes	Yes	1	Yes
HSM dissolved plus HSM particulate	Yes	Yes	Yes	Yes	1	Yes
LSM dissolved	Yes	Yes	Yes	Yes	1	Yes
HSM dissolved	Yes	Yes	Yes	Yes	0	No
LSM particulate	Yes	Yes	Yes	Yes	0	No
HSM particulate	No	Yes	Yes	Yes	1	Yes

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
2,4-DB				1		NJ											
2,4,5-T														140	G	J	

There are no COPCs/COPECs in the target analyte list for chlorinated herbicides.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] This target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary.

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 ORIGINAL SAMPLE - CHLORINATED HERBICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Chlorinated Herbicides Sample Collection Technique	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	No	Yes	NA	Yes	0	No
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	0	No
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	1	Yes
LSM dissolved	No	Yes	NA	Yes	0	No
HSM dissolved	No	Yes	NA	Yes	1	Yes
LSM particulate	No	Yes	NA	Yes	0	No
HSM particulate	No	Yes	NA	Yes	0	No

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
2,4-DB							0.31	B	NJ								

There are no COPCs/COPECs in the target analyte list for chlorinated herbicides.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] This target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 2 FIELD DUPLICATE - CHLORINATED HERBICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Chlorinated Herbicides Sample Collection Technique	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	No	Yes	NA	Yes	0	No
LSM dissolved plus LSM particulate	No	Yes	NA	Yes	2	Yes
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	0	No
LSM dissolved	No	Yes	NA	Yes	2	Yes
HSM dissolved	No	Yes	NA	Yes	0	No
LSM particulate	No	Yes	NA	Yes	0	No
HSM particulate	No	Yes	NA	Yes	0	No

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
2,4-DB				0.41		NJ											
2,4,5-T				0.21													

There are no COPCs/COPECs in the target analyte list for chlorinated herbicides.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] This target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary.

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 ATTEMPT 3 ORIGINAL SAMPLE - CHLORINATED HERBICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Chlorinated Herbicides Sample Collection Technique	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	Yes	Yes	4	Yes
LSM dissolved plus LSM particulate	Yes	Yes	Yes	Yes	2	No
HSM dissolved plus HSM particulate	Yes	Yes	Yes	Yes	4	Yes
LSM dissolved	Yes	Yes	Yes	Yes	2	No
HSM dissolved	Yes	Yes	Yes	Yes	4	Yes
LSM particulate	Yes	Yes	Yes	Yes	0	No
HSM particulate	No	Yes	Yes	Yes	0	No

Positive Target Analyte Identification and Concentration Comparison [c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
2,4-D	0.36	B	NJ	0.47	B		0.40	B		16.1							
2,4-DB	0.59	B					0.47	B	NJ								
2,4,5-T	0.10	G	NJ	0.09	G	NJ	0.022	G	NJ	123							
Silvex (2,4,5-TP)	0.051	B					0.023	B									

There are no COPCs/COPECs in the target analyte list for chlorinated herbicides.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] This target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

EVENT 1 ATTEMPT 3 DUPLICATE SAMPLE - CHLORINATED HERBICIDES

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Chlorinated Herbicides Sample Collection Technique	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Is fewer than 1 result "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	Yes	Yes	4	Yes
LSM dissolved plus LSM particulate	Yes	Yes	Yes	Yes	4	Yes
HSM dissolved plus HSM particulate	Yes	Yes	Yes	Yes	3	No
LSM dissolved	Yes	Yes	Yes	Yes	4	Yes
HSM dissolved	Yes	Yes	Yes	Yes	3	No
LSM particulate	Yes	Yes	Yes	Yes	0	No
HSM particulate	No	Yes	Yes	Yes	0	No

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water (µg/L)	LQ[d]	VQ	LSM Dissolved (µg/L)	LQ[d]	VQ	HSM Dissolved (µg/L)	LQ[d]	VQ	% RPD	LSM Particulate (µg/kg)	LQ[d]	VQ	HSM Particulate (µg/kg)	LQ[d]	VQ	% RPD
2,4-D	0.48	B		0.51	B	JH	0.41	B		21.7							
2,4-DB	0.28	B	NJ	0.44	B	NJ											
2,4,5-T	0.1		NJ	0.07	G	NJ	0.054	G	NJ	31.3							
Silvex (2,4,5-TP)	0.032	B	NJ	0.021	B	JH	0.021	B	NJ	0.00							

There are no COPCs/COPECs in the target analyte list for chlorinated herbicides.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] This target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list. Additional pages may be necessary

[d] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LSM = low-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
RPD = relative percent difference
µg/L = micrograms per liter
µg/kg = micrograms per kilograms
VQ = validation qualifier - See Attachment 2 for definitions
% = percent

Appendix H

Detailed Evaluation Sheets
(Worksheet #11) – Cyanide

EVENT 1 ORIGINAL SAMPLE - CYANIDE

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Cyanide Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the cyanide result free of any "R" flag (rejected due to association with severe data quality issues)?	Was cyanide positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	Yes	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate[c]	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[d]

Analyte Identified	Whole Water Concentration (µg/L)	LQ	VQ	HSM Dissolved Concentration (µg/L)	LQ	VQ	HSM Particulate[c] Concentration (mg/Kg)	LQ	VQ
Cyanide	29.3			31.3			5.8		J

There are no COPC/COPECs in the target list for Cyanide.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] HSM particulate based on a composite of debris and fines.

[d] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg = micrograms
VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 1 FIELD DUPLICATE - CYANIDE

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Cyanide Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the cyanide result free of any "R" flag (rejected due to association with severe data quality issues)?	Was cyanide positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	Yes	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate[c]	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[d]

Analyte Identified	Whole Water Concentration (µg/L)	LQ	VQ	HSM Dissolved Concentration (µg/L)	LQ	VQ	HSM Particulate[c] Concentration (mg/Kg)	LQ	VQ
Cyanide	27.2			31.6			6.4		J

There are no COPC/COPECs in the target list for Cyanide.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] HSM particulate based on a composite of debris and fines.

[d] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg = micrograms
VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 2 ORIGINAL SAMPLE - CYANIDE

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Cyanide Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the cyanide result free of any "R" flag (rejected due to association with severe data quality issues)?	Was cyanide positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	No	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water Concentration (µg/L)	LQ	VQ	HSM Dissolved Concentration (µg/L)	LQ	VQ	HSM Particulate Concentration (mg/Kg)	LQ	VQ
Cyanide	3.8	B	J	ND		U	2.4		M

There are no COPC/COPECs in the target list for Cyanide.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg = micrograms
VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 2 FIELD DUPLICATE - CYANIDE

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

Cyanide Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the cyanide result free of any "R" flag (rejected due to association with severe data quality issues)?	Was cyanide positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	No	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water Concentration (µg/L)	LQ	VQ	HSM Dissolved Concentration (µg/L)	LQ	VQ	HSM Particulate Concentration (mg/Kg)	LQ	VQ
Cyanide	2.3	B	J	ND		U	1.6		J

There are no COPC/COPECs in the target list for Cyanide.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg = micrograms
VQ = laboratory qualifier - See Attachment 2 for definitions

Appendix I

Detailed Evaluation Sheets
(Worksheet #11) – VOCs

EVENT 1 ORIGINAL SAMPLE - VOLATILE ORGANIC COMPOUND

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

VOC Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 2 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	NA	Yes	1	Yes
HSM dissolved plus HSM particulate[c]	No	Yes	NA	No (4)[d]	NA	NA

Positive Target Analyte Identification and Concentration Comparison[e]

Analyte Identified	Whole Water (µg/L)	LQ[f]	VQ	HSM Dissolved (µg/L)	LQ[f]	VQ	HSM Particulate[c] (µg/Kg)	LQ[f]	VQ
1,4-Dichlorobenzene	0.24	G		0.21	G		47		J
Chlorobenzene							1.4	G	J

There are no COPC/COPECs in the target list for VOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] HSM particulate based on a composite of debris and fines.

[d] Values in paretheses indicate the total number of rejected results.

[e] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

[f] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = laboratory qualifier - See Attachment 2 for definitions
VQ = validation qualifier

EVENT 1 FIELD DUPLICATE - VOLATILE ORGANIC COMPOUND

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

VOC Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 2 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	Yes	NA	Yes	1	Yes
HSM dissolved plus HSM particulate[c]	No	Yes	NA	No (4)[d]	NA	NA

Positive Target Analyte Identification and Concentration Comparison[e]

Analyte Identified	Whole Water (µg/L)	LQ[f]	VQ	HSM Dissolved (µg/L)	LQ[f]	VQ	HSM Particulate[c] (µg/Kg)	LQ[f]	VQ
1,4-Dichlorobenzene	0.22	G		0.22	G		15		J
Chlorobenzene							0.5	G	J

There are no COPC/COPECs in the target list for VOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] HSM particulate based on a composite of debris and fines.

[d] Values in paretheses indicate the total number of rejected results.

[e] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

[f] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = laboratory qualifier - See Attachment 2 for definitions
VQ = validation qualifier

EVENT 2 ORIGINAL SAMPLE - VOLATILE ORGANIC COMPOUND

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

VOC Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 2 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	NA	NA	Yes	1	Yes
HSM dissolved plus HSM particulate[c]	Yes	NA	NA	No (5)[d]	NA	NA

Positive Target Analyte Identification and Concentration Comparison[e]

Analyte Identified	Whole Water (µg/L)	LQ[f]	VQ	HSM Dissolved (µg/L)	LQ[f]	VQ	HSM Particulate[c] (µg/Kg)	LQ[f]	VQ
1,4-Dichlorobenzene	0.079	G		0.081	G				

There are no COPC/COPECs in the target list for VOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] HSM particulate based on a composite of debris and fines.

[d] Values in paretheses indicate the total number of rejected results.

[e] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

[f] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = laboratory qualifier - See Attachment 2 for definitions
VQ = validation qualifier

EVENT 2 FIELD DUPLICATE - VOLATILE ORGANIC COMPOUND

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

VOC Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes	
	Were specified sample aliquots obtained meeting all analytical needs?			Are fewer than 2 results "R" qualified (rejected due to association with severe data quality issues)?	Number of target analytes identified?	Does the sample collection technique have at least one more target analyte identified than the other sample collection technique?
	Attempt 1	Attempt 2	Attempt 3			
Whole Water	Yes	NA	NA	Yes	1	Yes
HSM dissolved plus HSM particulate	Yes	NA	NA	No (4)[c]	NA	NA

Positive Target Analyte Identification and Concentration Comparison[d]

Analyte Identified	Whole Water (µg/L)	LQ[e]	VQ	HSM Dissolved (µg/L)	LQ[e]	VQ	HSM Particulate (µg/Kg)	LQ[e]	VQ
1,4-Dichlorobenzene	0.080	G		0.078	G				

There are no COPC/COPECs in the target list for VOCs.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collected during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Values in paretheses indicate the total number of rejected results.

[d] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

[e] A "G" qualifier indicates the presence of a compound that meets the identification criteria; the result is below the PQL but above the method detection limit (MDL) or estimated detection limit (EDL), where appropriate. Values associated with a "G" qualifier are quantitatiovely less certain than those not associated with a "G" qualifier. This is because "G" qualified results fall below the low point of the calibration curve.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
µg/L = micrograms per liter
µg/Kg = micrograms per kilogram
VQ = laboratory qualifier - See Attachment 2 for definitions
VQ = validation qualifier

Appendix J

Detailed Evaluation Sheets
(Worksheet #11) – TEPH

EVENT 1 ORIGINAL - TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

TEPH Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the TEPH result free of any "R" flag (rejected due to association with severe data quality issues)?	Was TEPH positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	Yes	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate[c]	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[d]

Analyte Identified	Whole Water Concentration (mg/L)	LQ	VQ	HSM Dissolved Concentration (mg/L)	LQ	VQ	HSM Particulate[c] Concentration (mg/Kg)	LQ	VQ
TEPH	5.0	B	J	5.6	B	J	13000	BD	J

There are no COPC/COPECs in the target list for TEPH.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collectec during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] HSM particulate based on a composite of debris and fines.

[d] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
mg = milligrams
TEPH = total extractable petroleum hydrocarbon
VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 1 DUPLICATE- TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

TEPH Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the TEPH result free of any "R" flag (rejected due to association with severe data quality issues)?	Was TEPH positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	Yes	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate[c]	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[d]

Analyte Identified	Whole Water Concentration (mg/L)	LQ	VQ	HSM Dissolved Concentration (mg/L)	LQ	VQ	HSM Particulate[c] Concentration (mg/Kg)	LQ	VQ
TEPH	7.7	BD	J	3.5	B	J	13000	BD	J

There are no COPC/COPECs in the target list for TEPH.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collectec during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] HSM particulate based on a composite of debris and fines.

[d] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
mg = milligrams
TEPH = total extractable petroleum hydrocarbon
VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 2 ORIGINAL - TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

TEPH Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the TEPH result free of any "R" flag (rejected due to association with severe data quality issues)?	Was TEPH positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	No	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water Concentration (mg/L)	LQ	VQ	HSM Dissolved Concentration (mg/L)	LQ	VQ	HSM Particulate Concentration (mg/Kg)	LQ	VQ
TEPH	2.22	D	J	ND		U,J	13000	D	J

There are no COPC/COPECs in the target list for TEPH.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collectec during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
mg = milligrams
TEPH = total extractable petroleum hydrocarbon
VQ = laboratory qualifier - See Attachment 2 for definitions

EVENT 2 DUPLICATE - TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

QAPP Worksheet #11-1
Project Quality Objectives/Systematic Planning Process Statements (Phase I)
Phase I Data Comparison Chart

TEPH Sample Collecton Techniques	Sample Collection Quality[a]			Analytical Quality[b]	Identification of Target Analytes
	Were specified sample aliquots obtained meeting all analytical needs?			Is the TEPH result free of any "R" flag (rejected due to association with severe data quality issues)?	Was TEPH positively identified?
	Attempt 1	Attempt 2	Attempt 3		
Whole Water	No	Yes	NA	Yes	Yes (1)
HSM dissolved plus HSM particulate	No	Yes	NA	Yes	Yes (1)

Positive Target Analyte Identification and Concentration Comparison[c]

Analyte Identified	Whole Water Concentration (mg/L)	LQ	VQ	HSM Dissolved Concentration (mg/L)	LQ	VQ	HSM Particulate Concentration (mg/Kg)	LQ	VQ
TEPH	4.200		J	ND		U,J	7700	D	J

There are no COPC/COPECs in the target list for TEPH.

[a] A "NA" in one of the Attempt columns indicates that the analytical group had already been collected in a previous attempt and was not intended to be collectec during that column's attempt.

[b] Analytical quality is based upon the program 90% analytical completeness objectives.

[c] Positive target analyte identification and concentration comparison chart will comprise the detected analytes from the full target analyte list.

Notes:
COPCs = contaminants of potential concern
COPECs = contaminants of potential ecological concern
HSM = high-solids mass
LQ = laboratory qualifier - See Attachment 1 for definitions
mg = milligrams
TEPH = total extractable petroleum hydrocarbon
VQ = laboratory qualifier - See Attachment 2 for definitions